# Modern Shop

Lie and Beat will you

"ROCKWELL"

PUBLIC LIBRARY
SEP 1 0 1945
DETENT

above is our distered IRADE



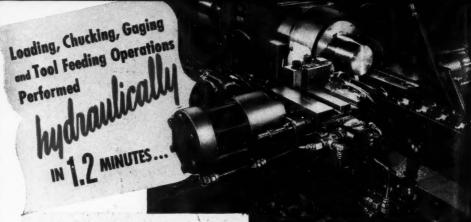
we are the SOLE

The world wide use of Hardness Testers made by WILSON has been going on increasingly for 24 years because of their universally acknowledged RELIABILITY, DURABILITY and LEADERSHIP IN DESIGN

A V 455 OCIATE COMPANY OF

WILSON MECHANICAL INSTRUMENT CO., INC.

369 Concord Ave., New York 54



Production of 155 mm. projectiles is speeded by Logan hydraulic equipment on Sparks semi-automatic lathes in this operation. A wide groove is turned on the shell. Chucking and gaging time is approximately 7.2 seconds . . . overall time including chucking, machining and unloading averages 1.2 minutes.

#### **HOW THE HYDRAULIC SYSTEM OPERATES**

Shells move on the conveyor to a point in front of the headstock. Here a Logan hydraulic cylinder operates an elevating mechanism which raises the heavy projectile for insertion into the collet-type chuck, eliminating operator fatigue. This cylinder also lowers a stop gage to assure precision location of the shell in the chuck.

The chuck is operated by a Logan rotating hydraulic cylinder mounted on the spindle. Another Logan hydraulic cylinder on the lathe carriage activates the tool slide, feeding the cutting tool into the work. Logan steel Collet Grip Tube Fittings are used throughout for leak-proof connections.

#### LOGAN CYLINDERS AND POWER OPERATED CHUCKS INCREASE PRODUCTION WITH ACCU-

RACY AND ECONOMY-Your chucking applications and power movements of all kinds can be handled faster, more accurately and more economically with standard Logan equipment . . . available in a range of types and sizes to make up complete hydraulic systems. Logan engineers will assist in your

design and manufacturing problems. No obligation.



#### WRITE FOR FREE LITERATURE

Ask for literature on Logan power operated chucks; hydraulic cylinders, valves and power units; and Collet Grip tube fittings.

#### on heavy 155 mm. shells by complete "LOGAN" HYDRAULIC INSTALLATION



#### Standard LOGAN Equipment for **Complete Hydraulic Systems**

- Logan Hydraulic Operated Chucks.
- Logan Rotating Hydraulic Cylinders. Rotocast Stationary Hydraulic Cyl-
- inders-Watch for announcement of complete new line.
- Logan Hydraulic Valves.
- Logan Hydraulic Power Units.
- Collet Grip Tube Fittings.



of

stie

car

the



The Greenlee 15%" Automatic Screw Machine pictured here is a good example of engineering skill and thoroughness in design and of care and accuracy in construction.

All the spindles of the machine are mounted in Timken Tapered Roller Bearings and Timken Bearings also are applied at other important points, 38 bearings in all being used.

Greenlee Bros. & Co. are equally appreciative of the value of Timken Bearings in other types of equipment which they manufacture and are just as liberal in their use of them. In their Automatic Transfer Processing Machine for aircraft engine cylinder heads for instance, over 225 Timken Bearings are used.

No matter what kind of equipment you manufacture or use, you will be well ahead by specifying Timken Bearings and making sure that every bearing has the trade-mark "TIMKEN" stamped on it. The Timken Roller Bearing Company, Canton 6, Ohio.



September, 1945

ucks.

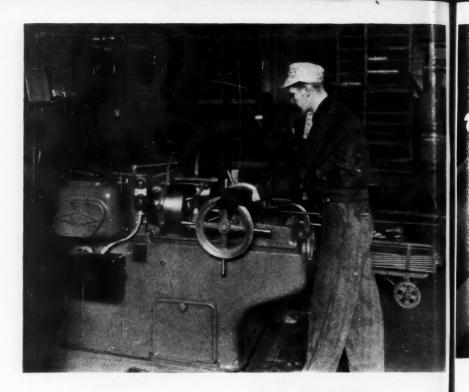
nders.

Cyl-

ment

CENTER AVE

ts.



### 

The Landmaco Threading Machine here illustrated is a general purpose machine. The thoroughly modern design, which permits quick set-up changes, makes it ideal for the short production run of tie-rods, a single rod for maintenance or a rush call for some special-threaded parts.

Its high operating speed assures unusual production figures in threading tough alloy steel jobs to close tolerances or in cutting the average commercial threads used in construction, reclamation and maintenance.

The Landmaco Threading Machine is accurate, fast, dependable and will handle all demands with a minimum of delay,

Write for Bulletin H-75

### LANDIS MACHINE COMPANY, WAYNESBORO

THREAD CUTTING MACHINES . DIE HEADS . COLLAPSIBLE TAPS . THREAD GRINDERS



#### With the Heald Gage-Matic Internal, Hole Sizes are Checked **FOR Not BY Your Operators**

Nothing wrong with hand plugging in grinding holes to size—except that it's slow and subject to the human element. And that means chances for costly errors that often result in spoilage and rejects. But, let a Heald Gage-Matic Internal take over, and you automatically banish such handicaps. You get all the advantages of a solid plug and in addition get faster, better, more profitable production.

Here's how Gage-Matic works: a set of solid, positive sizing gage-plugs attempt to enter the back of the hole with each pass of the wheel. When the roughing gage enters, the wheel is trued and grinding resumed. The instant the finish-size gage plug is able to enter the hole, your Gage-Matic automatically goes to rest position. Not a chance for oversize and scrap! Remember too, the Gage-Matic does this automatic checking of your work at split second intervals—regardless of minor irregularities in wheel wear; amount of stock; hardness or length of part; size of hole. Uniform accuracy is assured and tolerances to the closest limits are maintained. All your operator has to do is to load the work and throw the starting lever.

The Gage-Matic puts to work a principle wellproved by more than 15 years of successful use. Why not take advantage of Heald experience and ask a Heald Engineer to come in with facts that mean profits for you? No obligation.

THE HEALD MACHINE COMPANY

More Precision · Less Cost HEALD

INTERNAL AND SURFACE GRINDING MACHINES . BORE-MATIC PRECISION FINISHING MACHINES

proughly

run o

eel job

ion and

nds with

RO

J.S.A **NDERS** 

#### YOUR PLANT NEEDS THIS POST WAR MACHINE

## **QUAD-ACTION**

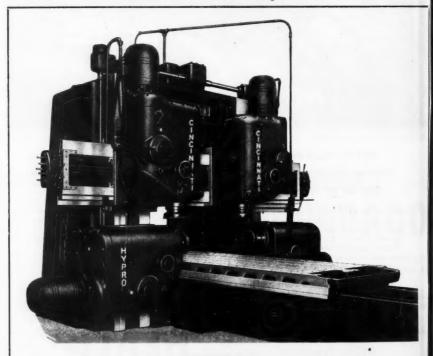
**HYPRO** 

PLANER TYPE MILLING MACHINE

In the highly competitive post war period, the Hypro Planer Type Miller offers exceptional advantages.

Its four heads work simultaneously and perform several operations at once—using only one set-up—saving time and manpower. Each head is individually powered with a 10 H. P. motor. Its massive, compact construction, scientifically reinforced, adds to its rigidity. Combination herringbone, gear drive to table assures smooth transmission of power, free from all side thrusts and guaranteeing extreme accuracy.

For more information regarding this versatile machine and its application, write today for Catalog MM-105.



THE CINCINNATI HYPRO PLANER COMPANY

CINCINNATI, OHIO

### OVER 18 PRODUCTS FROM ONE GEAR MACH

The Farrel-Sykes Gear Generator has become known throughout industry for its ability to produce continuous tooth herringbone gears. However, this is only one of a wide range of gears and parts which can be made on this machine. The following is a partial list.

 Sykes continuous tooth herringbone gears.
 Double helical gears with wide or narrow center groove—teeth matched or staggered—helices of similar or dissimilar pitch,

3. Single helical gears with external teeth.

4. Single helical gears with internal teeth.

5. Straight tooth (spur) gears,

6. Straight tooth gears with staggered teeth.

7. Straight tooth gears with internal teeth.

- 8. Cluster gears.

9. Angle gears.
10. Spiral gears.
11. Worms of high lead angle.
12. Racks—when machine is equipped with a special fixture. 13. Straight or tapered splined shafts with straight or helical

splines. 14. Sprocket wheels. 15. Reamers.

16. Carns. 17. Smooth cylindrical contours.

18. A variety of special contours.

Increasing experience is steadily widening the scope of usefulness of the Farrel-Sykes Gear Generator. It is a universal machine producing a maximum range of work with great speed, accuracy and economy.



NY

INE

period.

excep d per-

g only

Each

H. P

uction

igidity.

o table e from

extreme versatoday



It grinds to close tolerances immediately upon starting and maintains these tolerances throughout production runs.

Ask for descriptive bulletin.

If you will send us the serial numbers, we will gladly supply any information in our files regarding ABRASIVE Machines on the U. S. Gov. surplus machine tool list, and will endeavor to furnish attachments, accessories and repair parts as required.



ABRASIVE MACHINE TOOL COMPANY . EAST PROVIDENCE 14, RHODE ISLAND

stand

Gis

for lo

turret

indep

quick opera

anoth

where

1219 1 Look

TURR



## SPEED UP THE MACHINING CYCLE WITH 3-WAY POWER RAPID TRAVERSE ...

THERE is less time lag between cutting operations with a Gisholt Turret Lathe-thanks to this outstanding feature.

Gisholt provides power rapid traverse in all 3 ways for longitudinal travel of both the square and hexagon turret, as well as for the in-and-out movement of the cross slide. Traverses may be operated simultaneously or independently in either direction. Tools move more quickly in and out of cutting position—save time and operating effort to speed up production.

This 3-way combination of power rapid traverses, standard on all Gisholt Saddle Type Turret Lathes, is another exclusive Gisholt feature that makes for swifter, lower-cost production and wins favor among operators wherever it is used.

#### GISHOLT MACHINE COMPANY 1219 East Washington Ave. Madison 3, Wisconsin

Look Ahead . . . Keep head . . . With

Gisholt Improvements in Metal Turning



The photo above shows operating controls for 1. Longitudinal travers of the square turret 2. Cross travers of cross slide; 3. Longitudina traverse of the hexagon turret.

Gisboli's complete power rapid traverse is only one of many advanced features which speed up production and cut costs.

TURRET LATHES . AUTOMATIC LATHES . BALANCING MACHINES . SPECIAL MACHINES



Here's a pertinent question to ask your maintenance men and shop supervisors: How long do the grinding wheel spindle bearings last in your precision grinders? They might say, "Well, that all depends upon the finish and accuracy I want, and how hard I 'push' the machine to grind heavy stock removal jobs." If you have CINCINNATI's with FILMATIC Spindle Bearings in your shop. then their answer would be, "I don't know how long the bearings will last, for they have never given me any trouble." That's the FILMATIC record everywhere, for they have been giving trouble-free service on CINCINNATI Grinders as long as eight years. They are bearings with an enviable past, and a bright future, for FILMATICS just never quit regardless of what they're called upon to do. All CINCINNATI

Grinders are now equipped with FILMATIC Bearings, and you have a wide choice of these efficient and productive machines.

Centertypes—4", 6" and 10" Plain Hydraulic, 10" and 14" Light Type Plain Hydraulic, 14", 16", 20", 24" and 28" Plain Self-Contained; 12", 14", 16" and 18" Hydraulic Universals.

Centerless—Nos. 2, 3 and 4, and Centerless Lapping Machines.

You can't afford to overlook the advantages of CINCINNATI Grinding Machines with FILM-ATIC Spindle Bearings. The complete story of this unusual bearing may be found in booklet G-446. Write for your copy today.

#### CINCINNAT

CENTER TYPE GRINDING MACHINENTE

INCI

Se



#### ATGRINDERS INCORPORATED

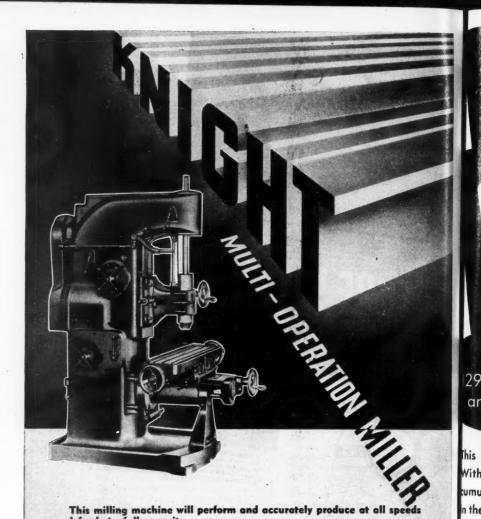
INCINNATI 9, OHIO, U.S.A.

MACHINE THE TERLESS GRINDING MACHINES . CENTERLESS LAPPING MACHINES

September, 1945

r, 1945

MODERN MACHINE SHOP



This milling machine will perform and accurately produce at all speeds and feeds to full capacity.

The KNIGHT MILLER will save you valuable hours on many jobs. A special swivel and tilting table feature saves the use of angle plates, cutters and special fixtures.

The No. 40 has a wide range of capacity fitting it for many jobs and uses. There are 16 different spindle speeds, also 16 table feeds available.

WRITE FOR FOLDER.

MACHINERY COMPANY 3924 W. PINE ST.

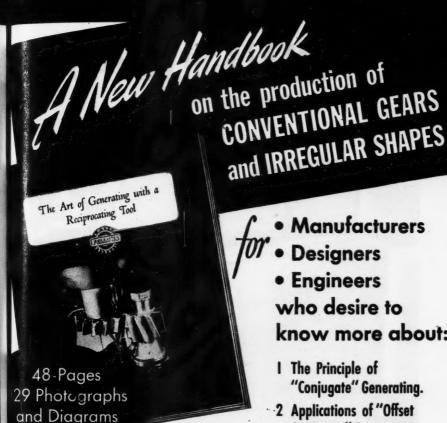
ng e

ene

pract

I H

78 Rive



his new handbook, "The Art of Generating With a Reciprocating Tool", is based on the umulative experience of close to a half-century n the production of precision gear manufacturng equipment. It covers the principle of the penerating process with many interesting and practical applications.

Manufacturers

**Designers** 

**Engineers** who desire to know more about:

- I The Principle of "Conjugate" Generating.
- 2 Applications of "Offset Conjugate" Generating
- 3 Applications of "Interrupted-Conjugate" Generating.
- 4 The Principle of "Describing" Generating."
- 5 Reciprocating Tool Applications and Attachments.
- \*Your complimentary copy will be mailed promptly on receipt of a request on your company's letterhead.

ELLOWS GEAR SHA

78 River St., Springfield, Vermant - 640 West Town Office Bldg. Chicago 12 Illinois - 616 Fisher Bldg. Detroit 2. Mich

## NEW SMALL HYDRAULIC

10"x 20" TYPE H



10"x 20" TYPE H HYDRAUL UNIVERSA GRINDER

## Precision Grunders

LANDIS TOOL CO.

Se

## UNIVERSAL GRINDER



• In the new small LANDIS TOOL 10"x 20" Type H Grinder the flexible operation and close accuracy are due to its universal features. Swivelling headstock and grinding wheel plus ease of setup and control make short production runs of small parts practical to instrument and aircraft accuracy.

LANDIS TOOL special features that contribute to accuracy and fine finish are: microsphere wheel spindle bearings; dynamically balanced rotating parts, and normalized, pre-aged castings. The variable voltage headstock drive is an exclusive LANDIS TOOL feature that provides an infinite number of speeds between 90 and 600 rpm. Fully electric with convenient rheostat control, it permits selection of the best speed for maximum production and finest finish. Fewer rotating and wearing parts are needed. Matched vee belts direct connected to motor and spindle plus only two preloaded super precision ball bearings eliminate vibration and give finer finishes. For further information, request Bulletin

345.

Landis Tool Special Features:

- \*VARIABLE VOLTAGE HEADSTOCK DRIVE
- \* MICROSPHERE SPINDLE BEARINGS
- \* DYNAMICALLY BALANCED PARTS
  - \* ANNEALED CASTINGS

LANDIS VARIABLE VOLTAGE
HEADSTOCK DRIVE

LANDIS VARIABLE VOLTAGE HEAD-STOCK DRIVE. Note simplicity two rotating parts, two bearings, matched vee bells.

> CONDENSED OPERATING DATA

Max. Dist. Between Work Centers 20"
Max. Work Swing 10%"
Max. Work Dia. (10" wheel) 10"
Work Speed rpm 90-600
Traverse Speed Range — 3" to 120" per min.
Headstock—swivels each way 90°
Grinding Wheel

Head swivels each way 90° Lower base swivels each way 90° Wheel Feed increment range .0003" - .003"



0"x 20

YPE H

DRAUL

1945

LANDIS TOOL\_

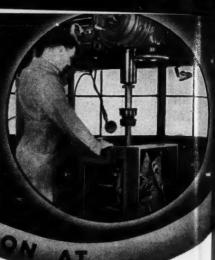
WAYNESBORO, PA.

September, 1945

MODERN MACHINE SHOP

1:

## FOSOICK



#### EX-CELL-0 CORPORATION

The part being drilled is only one of many parts of various Ex-Cell-O machines that are drilled, tapped or bored on the sturdy, time and labor saving FOSDICK RADIAL DRILL.

A box jig holds the work while drilling, reaming or tapping various diameter holes from two or more sides.

Note the convenience and time-saving features of cen tralized control in the head. A wide range of feed and speed changes, as well as hand feed are instantly available.

If your work can be handled on a Radial, it can be done of a Fosdick. Write for Bulletin MSR for full particulars

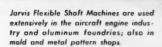
FOSDICK MACHINE TOOL CINCINNATI 23,



## **Harvis** Flexible Shaft Machines

Jarvis Multiple-Speed Flexible Shaft Machines make it possible for the metal craftsman, the finisher, and the cleaner to have a universal tool suitable for rotary filing, sanding, grinding, polishing, and buffing. There are Jarvis Flexible Shaft Machines and Tools that will satisfactorily meet your requirements.

Write for our new catalog MFTI.



labor

while pping from

feed

ndled ne of

lars



Jarvis Tools are made for efficiency and long life. For use with Jarvis Flexible Shaft Machines, in any finishing or cleaning operation.



THE CHARLES L. JARVIS CO., MIDDLETOWN, CONN.

TAPPING ATTACHMENTS . FLEXIBLE SHAFT MACHINES . GROUND ROTARY FILES





This book "Beyond a Shadow of a Doubt" will tell you more about our Optical Comparators and what they are doing. The tolerance on the profile of this form ground die section is plus or minus .0005". Inspection is simple—the profile is projected at 621/2 magnifications upon the 30 inch screen of the Jones & Lamson Optical Comparator and compared with the accurately scribed master outline.

The Jones & Lamson Pedestal Optical Comparator is an essential to the modern tool room. When equipped with all measuring attachments, lateral or vertical dimensions can be measured to within .0001 of an inch, and angles can be measured to within 5 minutes of arc—accurately and rapidly!

Photograph courtesy of Star Machine & Tool Company, Cleveland, Ohio



MACHINE COMPANY Springfield, Vermont, U.S.A.

Manufacturer of: Universal Turret Lathes - Fay Automotic Lathes · Automatic Double-End Milling and Centering Machines · Automotic Thread Grinders . Optical Comparators . Automotic Opening Threading Dies and Chasers.

## Would You Need More than 10 hours To Mill this Extrusion Die?





The speed and accuracy with which this extrusion die was milled is unusual — but it's typical performance for a Milwaukee Rotary Head Milling Machine — the most versatile machine ever designed for die and mold work. Read this job report: Moteriol . . . High Vanadium — High Speed Steel Operation . . . machine orifice of extrusion die. Time Distribution . . . set up, ¼ hour; layout, ¼ hour; rough mill outline, ¼" deep, 2 hours; rough drill opening through die, 1 hour; finish mill outline, ¼", 2½ hours; square cut corners with slotting attachment, ¾ hours; mill lead side of die, 3¼ hours; Total Time — 10 hours. No templets were required.

d

al

0

Check these advantages of the Milwaukee Rotary Head Mill Machine and how you can benefit from them in your own shop:

DIRECT — mills mold cavities in a single set-up without the aid of templets or models.

BUILDERS OF MILWAUKEE ROTARY HEAD
MILLING MACHINE • FACE MILL GRINDER • AUTOMETRIC JIG BORER • SPEEDMILL • MIDGETMILL • CENTER SCOPE.

ACCURATE—no changes in set-up eliminates chances for error. Exact control of all combinations of cutting movements— possible only with this machine—transmits mathematical precision to the work.

FAST — initial job preparation and set-up time is reduced to the minimum. Accurate performance of the machine saves operator's time and rapid production of the intricate molds and dies is the result. Write for Bulletin No. 1002C and complete information.

#### **KEARNEY & TRECKER**

Products CORPORATION

Milwaukee 14, Wisconsin
Subsidiary of Kearney & Trecker Corporation



Offices and Plant of The Adamant Tool Company, Bloomfield, New Jersey, upon the occasion of the Army-Navy "E" Award.

Offices and Plant Wheel Trueing Tool Company, Detroit, Michigan





AS a further development of our policy A of expanding and improving our services, facilities and resources, I am happy to announce that Wheel Trueing Tool Company has acquired the plant and equipment, name and goodwill of The Adamant Tool Company of Bloomfield, New Jersey.

The Adamant Tool Company has long been known to buyers of diamonds and diamond tools as one of the most progressive and competent organizations in this highly specialized field and it is therefore a pleasure for me to announce the union of the two companies.

Adamant recently acquired the consumer sales business of United States Industrial Diamond Corporation and will continue its service to the U.S.I.D. clientele as well as to the Adamant clientele.

All the well-known products of Wheel Trueing Tool Company will be available through the Adamant sales force which will thus supplement the Wheel Trueing sales force particularly in the Eastern Area.

This expansion of scope and resources makes Wheel Trueing Tool Company, more than ever before, one of the world's leading suppliers of diamonds and diamond tools.

#### COMPANY WHEEL TRUEING 3200 WEST DAVISON AVENUE . DETROIT, MICHIGAN

WHEEL TRUEING TOOL COMPANY
OF CANADA, LIMITED
575 Langlois Avenue
WINDSOR, ONTARIO, CANADA

THE ADAMANT TOOL COMPANY

Eastern Division of Wheel Trueing Tool Company
657 Bloomfield Avenue BLOOMFIELD, N. J.







## ENGINEERED To Reduce PRODUCTION COSTS!



Today, hundreds of cost-conscious firms are using Super-Cut Diamond Wheels to reduce tool grinding costs, improve tool performance, increase tool, drill and reamer life and they are getting the results desired. One firm reports grinding 200,000 drills with a stock Super-Cut. Others report similar cost cutting results . . . For abrasive wheel dressing and other diamond tool applications, Super-Cut offers a complete line of diamond tools especially engineered to assure long life and outstanding performance, substantially reduce your dressing costs.

Write today for free demonstration in your plant. Also send for free valuable literature on diamond tools and wheels.



**Industrial Abrasives** 

Headquarters for Diamond Wheels, Diamond Tools and Diamond Powder

3724 W. 38th St., Dept. 9-5, Chicago 32, III.

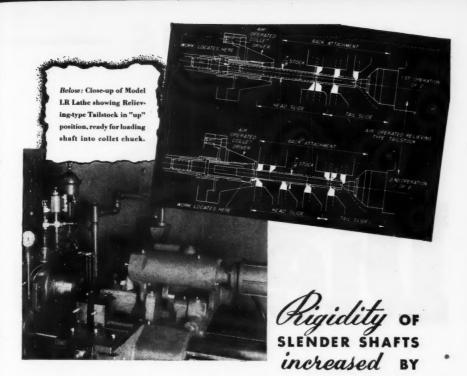


IN THE PICTURE FOR 1945

Make sure it is in your production line for 1945. Avey Drilling Machines give longer operating hours, smoother performance and lower maintenance. They'll do your war job now, your peace job later. We illustrate the Avey Type MA-6 in No. 2 size (Capacity in cast Iron,  $7/\epsilon''$ ). No. 3 size (Capacity in cast Iron,  $1/\epsilon''$ ). One to six spindle units, either size. Six speed machine, two speed motor, three mechanical changes through gearing, 8 to 1 speed range. Push button control. MA-6 illustrated, has three spindles, the Aveymatic Feed, Hand Feed and Tapper.

THE AVEY DRILLING MACHINE CO. Cincinnati, Ohio, U. S. A.

22



## So-swing Turning Method

♠ The Tooling layouts above illustrate a new work-holding method used successfully on a Model LR Lo-swing lathe for automatically turning slender shafts. Use of a Steady Rest, which was necessary to control springing when the same work was turned between centers, has been eliminated.

An air-operated collet driver grips the shaft well in from the end, exposing only the part to be turned, thus reducing the shaft's effective length and further reducing springing because of the rigid grip of the collet. A Relieving-type Tailstock facilitates loading and unloading and makes possible minimum overhang of the spindle.

Positive location of the work against the shoulder, rather than by center depth, insures increased accuracy of shoulder lengths. Greater shaft rigidity has resulted in longer Carbide Tool life. Inquiries from manufacturers having shaft turning problems are invited.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

### LATHE NEWS from SENECA FALLS

## HERE IT IS



#### Get in touch with us-

Complete Diecarb Engineering Services are ready for you—die designers, brazing engineers, practical grinding men—to help you and to teach your operating personnel the fine points and short cuts of Diecarb die-making and operating.

NEW YORK

HARTFORD

PHILADELPHIA

DITTERUDG

te

sa

If

po

## Firth-Sterling's

# ORIGINAL DEVELOPMENT of Sintered Carbide for BLANKING and FORMING DIES

**DIECARB** perfected over several years of research, trials and practical tests, is now offered to the trade for blanking die applications—a "natural" for extremely high production work, and providing extraordinarily long life between grinds.

**DIECARB** grades are available for blanking up to  $\frac{\eta_{16}}{16}$  in thickness for a variety of materials including metals, plastics, paper, etc. Performance runs have produced 10 to 1000 times the number of pieces per grind compared with former dies... downtime of six to eight weeks per year has been saved... operating costs have been lowered substantially.

If you have a blanking application now, or are planning postwar products where blanking and forming are important operations—investigate the possibilities of Diecarb.

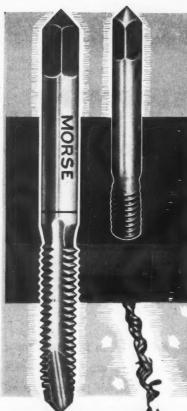
Firth-Sterling

STEEL COMPANY
Offices: McKEESPORT, PA.





CLEVELAND · DAYTON · DETROIT · CHICAGO · LOS ANGELES



## CHIPS

PROVE
CUTTING EFFICIENCY
OF
MORSE
TAPS!



MORSE two-fluted, spiral-pointed hand taps roll the chips ahead to prove cutting ease, speed and precision as they thread deep open-end holes. These taps effect measurable gains in quality and quantity production.

MORSETHERE IS A

TWIST DRILL AND MACHINE COMPANY

NEW YORK STORE: 130 LAFAYETTE ST. . . . . CHICAGO STORE: 570 WEST RANDOLPH ST.

SAN FRANCISCO STORE: 1180 FOLSOM ST.

FAST, UNIFORM PART MARKING...



And here's an outstanding feature: the Mercury Holder accommodates five type sizes, and all type is quickly interchangeable to meet a whole range of numbering needs. So, with even a single Holder and a selection of type sizes, you can be ready for any numbering job that comes along! The Mercury Holder is compact, important when working with small parts...it

construction for long life... it has just four simple parts... and it has many other important features you should know about. Hardened and ground hand cut steel type is available in a full range of sizes.

Full details, including ordering data and specifications for both hand and press style holders, are available for the asking. Write Department S today!





MERCURY METAL DIE AND LETTER CO. 546 EAST 16TH STREET, LOS ANGELES 15, CALIFORNIA



## When grinding and finishing costs are important, use 3-M ABRASIVE BELTS

• When grinding and finishing costs have to come down, you can look to 3-M Abrasive Belts to bring the economy you need. Their fast cutting speed; their ability to finish flat or curved surfaces with equal ease, and to grind and finish many jobs in one operation makes them thrifty with time. Their tough construction and ability to stay on the job longer make them low in cost per unit

finished. The smooth, even finishes they produce and their ability to finish low spots as well as high spots on a surface saves still more time and work. Used with a segment face contact wheel, they offer you an unbeatable combination of speed and economy. Order them by trade name . . . 3-M Abrasive Belts . . . from any distributor of 3-M products.

Name Minnesota Mining and Manufacturin	
GINERAL OFFICES SAINT PAUL	
Address	



## Calling SURGERY

The second Nichols Miller ever made was "Called by Surgery," and is still on the job producing surgical instruments.

The production of surgical instruments demands accuracy, fine finish and the ability to machine unusual forms. The Nichols Miller is designed for such work. Contour milling is done easily with the rise-and-fall spindle. The Nichols can do conventional milling, grinding, turning and boring just as easily—any job within its capacity requiring tolerances to "tenths."

Your products may not be surgical instruments, but your problems in production are the same. A Nichols Miller is the answer.



This new catalog on the Nichols Miller is free for the asking.

THE Nichols MILLER

MANUFACTURED BY W. H. NICHOLS & SONS, WALTHAM, MASSACHUSETTS
NATIONAL DISTRIBUTORS: NICHOLS-MORRIS CORP., 44A CHURCH ST., NEW YORK 7, N. Y.

## Federal RESISTANCE SPEEDS Parts Production



A slight change in design, a standard Federal P1, 75 KVA Press Type Welder and a simple set of dies met the challenge... more than doubled production of the item.

The wheels are made from identical stampings of mild steel. They had previously been spot welded at a fairly good.

stampings of mild steel. They had previously been spot welded, at a fairly good production rate. Straight thinking design and production heads at The Shuler Company combined their ideas with advice from a Federal applications engineer. Four small projections were added to the

T'S an essential industry, teaching babies to walk, helping mothers to transport them; and when The Shuler Company of Cleveland, makers of the popular Shuler Baby-Walker, were given an OK to try to meet the tremendously growing demand, one problem was to increase production of the sturdy Shuler

stampings, copper ring dies, made

ABOVE...The Federal P1, 75 KVA Press Type Welder as installed at the Shuler Plant- At right, eperating sequence...

A . . . Helper places first stamping in die, projections up.

B... Operator places second stamping, projections down. Projections contact face of apposite stamping.

C . . . A touch of the operator's foot on convenient switch completes the sequence, and another wheel blank. Loss than three seconds from steck pile to tote box. Single operator con continue at approximately same speed while helper is maving up stock.



#### THE FEDERAL MACHINE AND

### WELDING 100%

from alloy castings, installed on the standard Federal press welder, and the problem was

solved. The new method, producing 1,000 wheel blanks per hour, is shown below in pictures that tell their own story.

Not a revolutionary idea, by any means, but it doubled production on the needed item, and that is typical of resistance welding possibilities throughout the metal working industry. A Federal Press Type Welder such as the one illustrated, or related models in suitable capacities, might have similar application to, let us say . . .

Instrument Assemblies . . . Gauge Cases . . . Electrical Fixture Parts ... Lock Assemblies ... Automotic Valve Components ... Automatic Switch Parts ... Radio Chassis Components ... a wide variety of Hardware . . . Ventilator Grilles . . . Speedometer Casings . . . Ash Trays and other Novelties . . . Two Piece Ventilated Container Caps . . . Radio Tube Assemblies ... Oil Cleaner Assemblies or what have YOU that might be profitably converted to resistance welding if the facts were known .

Federal Press Type Resistance Welders (you can spot weld on them, too) are described fully in Federal Bulletin 4520. Write for your copy today. Remember, in resistance welding, the name of authority is FEDERAL.





WELDER CO. 218 Dana Street
WARREN, OHIO

#### VERSATILE MODERN PRODUCTION TOOLS

#### **WELDERS WITHOUT PRIORITIES**

Announcement is made by Sales Man-ager John E. Ponkow, of The Federal Machine and Welder Company, that his company is now in a position to accept unrated orders for resistance welders. While priorities still are all that the name implies, and important war production still is the first obligation, bookings are now being made and delivery dates assigned to a large number of orders outside of the critical category, Mr. Ponkow said. Delivery schedules while far from normal, are improving

#### "TAKE THE WELDER TO THE JOB"

In a large sheet metal shop two men were assembling an angle iron framework which was to be the skeleton for a stainless steel kitchen sink and cabinet installation for a large hotel.

Why don't you spot weld some of that work?" asked a man standing with

the shop foreman.

"How the ... can you horse a bunch of awkward stuff like this through a spot welder?" one of the workers re-torted. "And besides, all of our work is special, we don't have enough of any one assembly for that sort of work."

"You don't have to take the job to the welder, I'll show you how to take a spot welder to the job," the visitor said, and proceeded to demonstrate the application of portable, gun-type spot welders to the job. He also proved that they did not need to have long production runs to make this type of automatic resistance welder profitable. The caller was a Fed-eral Welding Application Engineer, and those men now are using a Federal monorail suspended portable welder with a variety of special "guns" speed up all kinds of sheet metal fabrication in which the shop specializes.

#### **AUTOMATIC STUD WELDER**

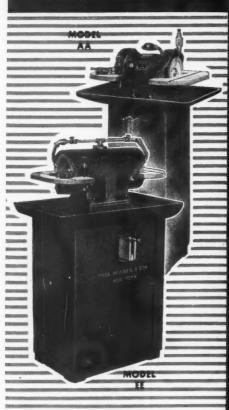
Welding certain types of lugs and studs to small machine mounts on a production basis sometimes turns out to be a bit of a trick. One solution which has proved a time and money saver is automatic resistance welding. A Federal press-type projection welder with a special fixture and automatic feed was set up for one motor company to pro-duce mounts complete with studs or threaded lugs (set-up interchangeable to meet production schedules) at the rate of 600 per hour.

#### SPOT AND/OR PROJECTION WELDERS

The difference between spot welding and projection welding, and informa-tion on how one Federal resistance welder can be used interchangeably for either method is included in a new bulletin on press-type welders just re-leased by The Federal Machine and Welder. This is one of the most versatile of all types of resistance welders. Title is "Federal Bulletin 4320."

# PROSSER Carbide Grinders





For fast, efficient rough grinding and fine finishing of carbides, stellite, high speed steel, and other modern tools, install Prosser Carbide Grinders. Their rugged construction, modern design, and ease of operation insure long, dependable and profitable service.

Prosser Carbide Grinders are built in bench and floor models of several capacities, for wet or dry grinding. Attachments for chip breaker and drill grinding.

#### Important features include:

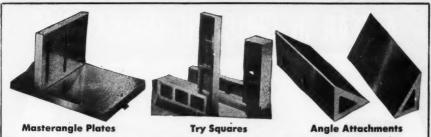
- · Quick-acting indexing tables.
- · Adequate wet-grinding equipment.
- High grade ball bearing spindles.
- Oversize wheels, giving longer wheel life, and permitting grinding of larger tools.
- · Moderate price.
- Prompt deliveries.

Write for details

Thomas Prosser & Son
120 WALL STREET . NEW YORK 5, N. Y.

SOMETHING NEW HAS BEEN ADDED TO OUR LINE OF

### MEEHANITE METAL PRODUCTS



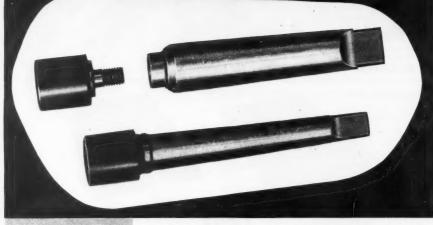


Write for Literature

ACME TOOL COMPANY

202 CHURCH STREET NEW YORK 13, N. Y.

## SAVE HUNDREDS OF DOLLARS A YEAR IN CHUCKING OPERATIONS



PORTABLE DRILLS
BECOME ALL-PURPOSE
TOOLS WITH KETT
ATTACHMENTS



The KETT Chuck and Morse Taper Arbor Combinations are a brand new answer to your tool holding problems. One Kett Chuck replaces an entire set of collets. It takes all drill sizes from No. 80 to full ½" drill without changes of any kind—rugged "three jaw power grip" construction insures gripping power equal to chucks several times its size. Concentricity guaranteed within .002.

Supplied in 0, 1 and 2 Morse Taper or with straight shank arbors. Their accuracy, gripping power and small size combine to give you precision tools that save labor, time and money.

WRITE FOR COMPLETE DETAILS.

THE KETT TOOL COMPANY

1 5 East Third St Cincinnati ? Ohio



IT illustrates the markings for Coated Abrasives by "CARBORUN-DUM." How these products are easily identified by end use...clearly marked with the specifications on both package labels and backing material...easy to order because you know exactly what you are using. In addition this new book gives you information you will find helpful concerning Coated Abrasives by "CARBORUNDUM" and their wide range of uses. If you have not yet received your copy, be sure to write us today. The Carborundum Company, Niagara Falls, New York.

#### ARRASIVE TOOLS FOR METALWORKING

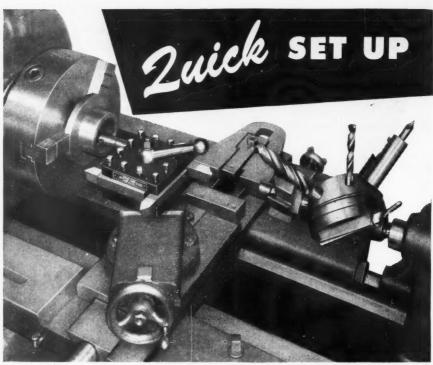
METAL CLOTH... SANDER DISCS...INDUSTRIAL CLOTH... POLISHING PAPER
... CROCUS CLOTH ... WATERPROOF PAPER ... SLEEVES ... CARTRIDGE
ROLLS ... SLOTTED DISCS ... CLOTH DISCS ... CONES ... CRANKSHAPT
ROLLS ... "ECONOMY" ROLLS ... EMERY CLOTH ... INDUSTRIAL CLOTH BELTS

#### HERE'S WHAT'S IN IT!

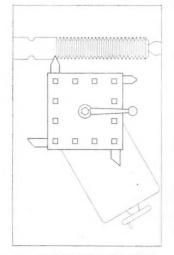
- 1. Sanding and Finishing Processes.
- 2. Abrasive Grains.
- 3. Classification of Grain Sizes.
- 4. Bonding Materials.
- 5. Coatings.
- 6. Backing Materials.
- 7. Flexing.
- 8. Suggestions for stocking.
- How to identify and specify Coated Abrasive Products by "CARBO-RUNDUM,"
- 10. Recommendations for Belt Splices.
- 11. Machine specifications for Belt Sanding.
- 12. Specifications for Standard Coated Abrasive Products.



("CARBORUNDUM" is a registered trade mark of and indicates manufacture by
The Carborundum Company)



Model  $4\frac{1}{2}$ -S Enco Turret used to thread lathe chuck adapters. Complete operation is finished without changing tools. Tailstock Turret mounts 6 tools and eliminates tool changing.



All Enco Turret Tool Posts have 12-station indexing spaced 30° apart. This permits 3 working positions for each tool. For example, a facing tool can be used for turning and also for chamfering by indexing to the next position. All models mount standard rectangular or square bits as well as standard cut-off blades and boring bars.

The accuracy built into Enco Turrets permits precision indexing of the turret block. Facing, turning, necking, and threading operations can be accurately repeated by correct use of lathe dials or micrometer stops.

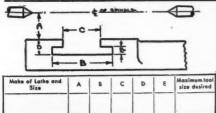
# FOR threading

# with Enco 30° Indexing!

Internal or external threading can be accurately done with threading tools mounted in an Enco Turret. The threading tool is returned to position square with the work while the compound rest is set over 30°. Facing, turning, necking, and threading tools can be set up to eliminate tool changes.



"A" dimension range (From dia- gram on this page)	MODEL 6-S 2" to 3-1/8" incl.	MODEL 41/4-S 1-9/16" to 2-1/2" incl.	MODEL 31/2-S 1-1/8" to 1-3/4" incl.	MODEL 21/2-S 7/8" to 1-5/16" incl.	MODEL H 7/8" to 1-5/16" incl.
LATHE SWING	16" SWING & UP	13" to 16" SWING	10" to 13" SWING & BENCH LATHES	BENCH LATHES	BENCH LATHES
TOOL SIZE RANGE	5/8" to 1-1/4" or No. 2 toolholder 3/8" square bit — High speed or carbide. (Where no tool bit size is specified, turret will be furnished for No. 2 Tool Holder.)	3/8" to 3/4" (Where no tool bit size is specified, turret will be furnished for 3/4" tool bit.)	1/4" to 1/2" (Where no tool bit size is specified, turret will be furnished for 1/2" tool bit.)	1/4" to 3/8" (Where no tool bit size is specified, turret will be furnished for 3/8" tool bit.)	1/4" to 3/8" (Where no tool bit size is specified, turret will be furnished for 3/8" tool bit.)
SPECIFICA- TIONS	4 tool, 12 positions 6' square Mac-its Tool Post Screws Packed in crate Shpg. wt. 37 lbs. Price \$99.00	4 tool, 12 positions 4-1/2" square Packed in carton Shipping weight 16 lbs. Price \$40.50	4 tool, 12 positions 3-1/2" square Packed in carton Shipping weight 8 lbs. Price \$35.00	4 tool, 12 positions 2-1/2" square Packed in carton Shipping weight 4 lbs, Price \$23.00	6 tool, 12 positions 2-3/4" hex Packed in carton Shipping weight 4 lbs. Price \$25.00



#### IMMEDIATE DELIVERY

on Turrets for these lathes: Atlas, South Bend, Logan, Sheldon, Clausing

Also all models with machinable base on center post for quick adaption to your lathe. One-week delivery on ENCO Turret Tool Posts made to specifications. When ordering, furnish all required dimensions and tool size desired.

ENCO MANUFACTURING COMPANY, Dept. 57

General Office and Factory: 4522-24 Fullerton Avenue, Chicago 39, Illinois

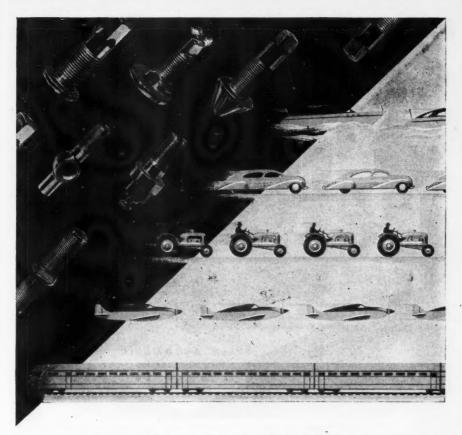


# Big. Tough Jobs

#### WILLIAMS "SUPERECTOR"

● This rugged, reversible ratchet wrench is designed for speed and power. Quadruple pawls, rather than a single pawl, combine with a dropforged handle to give it unbelievable strength. Twenty teeth on all sockets—both hex and square—permit complete rotation of nuts with only 18° handle swing. Made in five brawny sizes up to 53" long, accommodating sockets with openings from 1" to 4-5/8". Sold by Industrial Distributors everywhere. J. H. Williams & Co., Buffalo 7, N. Y.





#### Ready for Your Business

Here is only a handful of the kind of cold forgings Allied is ready to make by the million for trucks, tractors, automobiles, refrigerators, rolling stock and other peacetime machines.

Each forging of each type is exactly alike, even to the finest tolerances. Cold forged in one piece from coiled steel wire or bars, each embodies the strength, precise dimensions and flexibility of design that make dependable quality synonymous with the Allied name. Allied knows when the tremendous material savings that can result from cold forgings are practicable and how to effect them . . . and when the added strength of cold-forged parts can contribute to an end-product or a manufacturing operation. Find out just how ready Allied cold forgings are for your business. Send in your blueprints . . . or write to Allied today.

#### ALLIED PRODUCTS CORPORATION

Department 27 4624 Lawton Avenue Detroit 8, Michigan



Now, whether your jobs are large or small DO IT WITH A DUOMATIC! The 3A Duomatic—a full automatic lathe—has long proved its ability to cut time, increase output on a wide range of work. Now, Lodge & Shipley introduces ano

The 2A Duomatic is designed for smaller jobs, yet it retains all the features of the big, powerful 3A. Operations are entirely mechanical. Dual tool slides and carriages permit any combination of turning and facing cycles—front and rear, simultaneously or independently. As on the 3A,

front or rear cross slides swivel to any angle for a wide variety of facing operations. No cams are required to change cycles. Easy adjustments permit fast, accurate handling of large or small runs. Like two lathes in one, this new automatic may easily replace several of your older, work-worn machines. It's another ex-

may easily replace several of your older, work-worn machines. It's another example of Lodge & Shipley leadership in lathe design—made possible through 52 years of specialized lathe experience. For details on the new 2A Duomatic write on your company letterhead.



# controller. LLING

**PROFILING** TWO ORIFICES OF IRREGULAR SHAPE IN TUBULAR PIECE From ONE FLAT MASTER

SIX Operations Completed on ONE Machine in 40 Min.,

Gorton Tracer-Control Duplicating provides & simple, fast and accurate means for machining months of the second provides as the second pr simple, fast and accurate means for machining irregular shapes in parts like this Bronze Recoil sleere shown above. Specifications for his job called for an orifice on opposite sides of the shape shown above.

Both orifices required a rough, semi-finish and finish cur—the laster with a 1/4" diameter and finish cur—the laster with a 1/4" radii at the two rough and recorders. Only one set-up is necessary to compere the six operations (3 curts around each of plete the six operations (3 curts around expert wo orifices) accomplished with a high degree of uniform accuracy, in 40 minutes, floor-tothe sleeve revo orthices) accomplished with a nigh degree of uniform accuracy, in 40 minutes, floor-to-

The simplicity of Tracer Controlled operation by The simplicity of Tracer.Controlled opera-tion permits even the most difficult work to be accomplished by inexperienced helpfloor time.

\*NOTE—Time greatly reduced in other plants by use a battery of six or more Gorean Duplicators in multia battery of six or more Gorean Duplicators in multidef three (1 | y each cut) eliminating ALL cutter chan

Operations — Rough, Semi-finish and Finish Milling of TWO irregular shaped sleeve orb

Corners—(only 3 needed)—Four-flute, fast spiral end mill 7/16 diameter, two End bills, 3/2" and 1/4" diameter.

\$peed-1900 r.p.m.

obligation.

Production 40 minutes per sleeve. Food-Manual.

GORTON FREE ENGINEERING SERVICE You are invited to consult Gorton antiquers You are invited to consult Gorton engineers, on any jobs applicable to Gorton equipment of the state of the s Please submit details of your 100 to your markets.
Gorton Dealer or Factory at Racine, Wisconsin.
Recommendations made without charge or

TEAR OFF COUPON AND MAIL TODAY

DRTON Precision





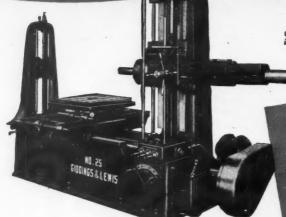






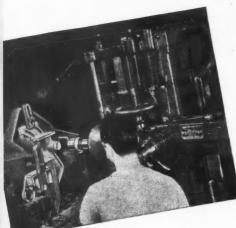


# G&L halves machining time on this



G. & L. No. 25RT Horizontal Boring, Drilling and Milling Machine.

Machine Bores,
Mills and Turns
Side Bracket in
Single Work Setting
Difficult Dimensions
and Alignments Held



• Floor-to-floor time on this angular side bracket was cut from 8 to 4 hours through the use of a standard G. & L. Horizontal Boring Machine equipped with a special holding fixture. The built-in accuracy of the G. & L. produces the required dimensional tolerances; the holding fixture makes it possible to align the center line of bore with the gib bottom to .001", and the center line of the hub with the lower pad to .002".

It is entirely possible and practical to use the G. & L. No. 25 for extremely accurate operations on a wide variety of small work. Both the rectangular

G. & L. No. 25RT Horizontal Machine turning 2" hub. Note holding fixture mounted on built-in rotary table.



GIDDINGS & LEWIS

146 DOTY STREET



plain or the built-in rotary table can be used to advantage on work requiring drilling, milling, boring, turning, facing, back facing, recessing and other operations.

### Accuracy Through Single Work Setting . . .

Where several types of machines must be used, routing the work from one machine to another requires a setup on each machine. This procedure often takes more time than the actual machining operations, and increases the margin of error in the finished product. Where work is performed on a G. & L. machine valuable production time is saved, for only a single work setup is required which insures against cumulative error through multiple work settings.

### Machine Small Work Faster and Easier . . .

Many plants have a wide variety of small horizontal boring, drilling and milling jobs, which are being done on single purpose machines or large horizontal boring machines. The G. & L. No. 25 machine is especially designed to handle such work faster and more economically. Our engineers will be glad to advise you how this machine will speed production in your plant.

FREE ADDITIONAL DATA on standard and built-in rotary table type machines and timesaving accessories. Write for Catalog No. 25T44 today. Kindly indicate your business connection.

### **MACHINE TOOL COMPANY**

FOND DU LAC, WIS.



# STANDARD MILLING CUTTERS STANDARD MILLING CUTTERS WITH THE

**EVEL** NO. 22 UNIVERSAL



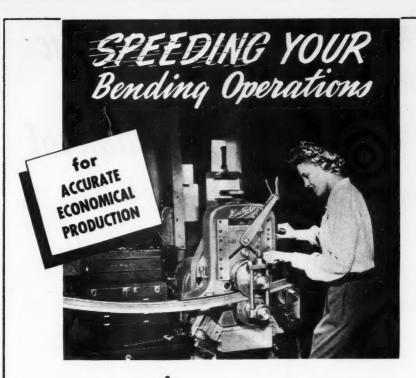
Set-up for sharpening a shell end milling cutter. Standard Radius Grinding Attachment mounts directly on table, has two micrometer adjustable cross slides and 360 degree pivot. Height from base to top of table is 6". Top slide is 4%" wide x 12" long and moves 6".

# WITH THE COVEL NO. 22 UNIVERSAL CUTTER AND TOOL GRINDER

on the job, you can stop worrying about the high cost of cutter replacements. Mount a COVEL Standard Radius Grinding Attachment on the No. 22 and put that pile of dull cutters back to work — with cutting edges perfectly sharpened and ready to knock production costs into a tailspin.

See your nearest COVEL Dealer or Write for Bulletin MM95.







#### BENDING ROLLS

● You'll save money, turn out far more in circle, spiral and segment bending of angles, tees, beams, channels, flats, tubes, rounds, squares, special shapes with "Buffalo" OA Bending Rolls! Hastening Victory in high-speed, accurate war production, "Buffalo" Bending Rolls are ready for peacetime operations WITHOUT ALTERATION. Easily operated by inexperienced workers. Send for Bulletin 352-A.



#### **BUFFALO FORGE COMPANY**

388 BROADWAY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo

Type OA
BENDING ROLLS



# Examine the Diamond with Great Care

The Diamond—that's what you actually buy and use when you get a diamond tipped tool. All the rest is only the holder. So, look well to the diamond.

Whatever you pay should give you the true measure of the value and worth of the diamond—and the better the stone, the better the tool and its performance.

It just doesn't pay to buy "cheap" diamond tipped tools—and we do NOT make them.

To get real quality diamonds—set by the Meinhardt Thermal Process (low temperature)—as shown in the cut-away picture above, always specify

#### MEINHARDT

on your orders for diamond tipped tools and get guaranteed satisfaction.

SPECIAL NOTE: Write your specifications and we will quote, immediately, in any type of mount and holder.

GEMS OF  $\widehat{M}$  INDUSTRY

#### MEINHARDT DIAMOND TOOL CO.

2810 Milwaukee Ave.
CHICAGO 18, ILLINOIS

We also offer a full line of diamond grinding and finishing wheels. Write for Catalog 845.



# 66% FASTER

#### D GRINDS 'EM FLUSH

HIS manufacturer of lift trucks was using straight wheel grinders to finish welds of sub-assemblies. Operators had difficulty in holding wheels on welds and preventing wheels from digging into the plate.

"It's work for a vertical grinder with 6" flared cup wheel," suggested the Rotor Application Engineer. Rotor Powerplus Grinders were installed. Results:

66% faster grinding because it's easy to hold

wheel on the weld and make every r.p.m.

Smoother finish because flat surface of wheel doesn't dig into plate. Finished surface is

The Rotor Application Engineer can be a valuable ally in boosting your production. Call him for advice anytime.

Yours for better grinding faster,

AIR O'TOOL



ROTOR TOOL



# Talk About PRODUCTION Without

#### 4,000 PARTS per DAY with DI-ACRO Bender

"Enclosed pictures in our plant prove the DI-ACRO Bender will do a real production job. We are making 4,000 completed parts per day which is competitive to most Power Presses." (Name on Request.)

Here is an example of "DIE-LESS DU-PLICATING" typical of a great variety of formed parts readily made with DI-ACRO Precision Machines, - Benders, Brakes, Shears. Picture below shows the DI-ACRO Bender making an acute right angle bend and photograph above shows the finished part formed to die precision. Women operating DI-ACRO units maintain a high out-put on production work.



# DI-ACRO Shear

Squares and sizes material, cuts strips. makes slits or notches. trims duplicated stampings. 3 sizes.

Shearing widths, 6". 9", 12".

#### DI-ACRO Brake

Forms non-

stock angles. channels or "Vees". Right or left hand operation, 3 sizes. Folding widths, 6", 12", 18",



showing DI-ACRO Precision Machines and many examples of parts made with "DIE-LESS DU-PLICATING".



DI-ACRO IS PRONOUNCED "DIE-ACK-RO"

### O'neil-irwin mfg.co.

306 EIGHTH AVE. SOUTH . MINNEAPOLIS 15. MINNESOTA



# Q, for accuracy

one reason why you'll find Starrett Precision Tools a prominent part of the picture in these action shots at American Car and Foundry's Berwick, Pa. shops.

R

R

E



# C, for confidence

another reason for the widespread use of Starrett Tools at this shop. Men work better and faster because of their confidence in products of the "world's greatest toolmakers," Starrett Tools.



# f for finish

skilled workers at O.C.F., in common with all who take pride in the quality and accuracy of their work, like the "feel" and balance of Starrett Tools, the clean distinct markings, the design refinements that mean so much when you're working with tools day in and day out.



It pays to stick to Starretts. Ask your mill supply house to make your Micrometers, Calipers, Vernier Gages, Dial Indicators and other precision measuring tools, STARRETTS.

THE L. S. STARRETT CO. • ATHOL • MASS. • U. S. A

## STARRETT

PRECISION TOOLS . DIAL INDICATORS . GROUND FLAT STOCK HACKSAWS . METAL CUTTING BANDSAWS . STEEL TAPES

### **GET THE FACTS:**

# on AMERICAN No. 2 MILLING MACHINES

(UNIVERSAL AND PLAIN)



Illustrated above is the No. 2 American
Universal Milling Machine. Note the
conveniently located speed and feed
changes, push button control and
clutch lever, adding to ease of
operation.

You'll want to get all the facts on the No. 2 American Milling Machines. They'll prove interesting to you.

#### Some of them include:

Standardized Spindle Nose. Heat treated chrome-nickel steel with No. 40 taper.

Infinite spindle speeds 25 to 500 R.P.M.

Motor in Base Drive.

U. S. Vari-Drive motor. Twin Disc Duplex Machine Tool Clutch.

Heavy Rugged Construction.

Heavily proportioned column
houses motor drive and
power shafts.

Working surface and overall size of table, 46" x 10\(\frac{10}{2}\)". Longitudinal range, 25". Transverse, 9". Vertical, 19". 16 geared feeds.



Write for Bulletin giving complete information and specifications.

No obligation.

J. L. LUCAS & SON, INC.

BRIDGEPORT 5

CONNECTICUT

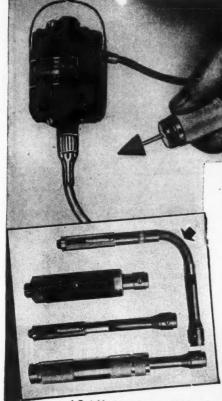






Touching Up Production Setups Without Disassembly

# Saving MAN HOURS in thousands of American plants in the DEBURRING AND FINISHING OF SMALL PARTS FOREDOM FLEXIBLE SHAFT MACHINES



4 Quickly-interchangeable handpiece types—pencil sizes and larger—some with flexible wrist—see arrow. Here's versatility plus in any man's language. Let Foredom solve your production problems too. Pencil-size handpieces for the hard-tereach places. Larger, ball-bearing handpieces for the heavier jobs, all quickly interchangeable. Flexible shafts which really ARE FLEXIBLE.

#### 3 WAYS Right!

- For de-burring, grinding, finishing, polishing and other light production jobs—particularly valuable on irregularly-shaped parts.
- In tool and die departments, for grinding, finishing and touching-up dies, molds, jigs, etc.
- For maintenance and emergency needs touching up set-ups without disassembly, removing high spots on gears, identification marking of equipment, etc.

THOUSANDS OF PLANTS USE FOREDOMS, including Ford, General Motors, Chrysler, Nash-Kelvinator, Jack & Heintz, Sperry Gyroscope, Bendix, Westinghouse, etc.

Models from \$17.50 to \$48.75. Catalog No. 73

Models from \$17.50 to \$48.75. Catalog No. 73 shows complete line and many uses — may point the way to solving some of today's production and maintenance problems. Write for your copy.

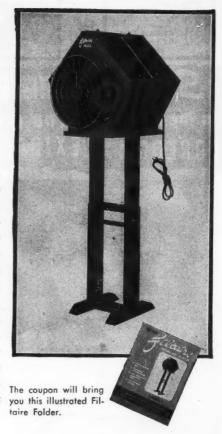
Order from your regular Mill Supply House or direct

FOREDOM ELECTRIC CO., 27 Park Place, New York 7, N. Y.

\* \* \* \* \* \* \* \* \* \* \* \* \*

# <u>Dust</u> NEED NOT MEAN <u>Ruin</u> TO MACHINES

Dust can be ruinous to bearings, motors, plant interiors, and workers' health. So why not control the dust in your plant, and add life to your machines and equipment by using the Filtaire Portable Dust Collector? This inexpensive unit is easy to operate—just plug it into any handy 110-volt outlet and it's ready to go. Filters may be of the permanent or replaceable type — motor and bearings are sealed against dust and grit - the Filtaire is adjustable for any grinding or polishing operation — it is self-contained and requires no hoods or piping — it will pay for itself quickly in dozens of spots in your shop.



#### Mail the coupon today for complete details.

MMS

	2121
NAME	TITLE
COMPANY	

Please send latest folder describing the Filtaire

in detail.

EDWARD BLAKE CO. 634 COMMONWEALTH AVE. NEWTON CENTRE 59, MASS.

BLAKE TAP GRINDERS — FILTAIRE PORTABLE DUST COLLECTORS — AMERICAN TOOL HOLDERS —
BLACK DIAMOND PRECISION DRILL GRINDERS — WALTHAM CUTTER SHARPENERS

# PRODUCTION WITH PRECISION ASSURES PROFITS

The Rivett 918 Hand Screw Machine can produce in volume and maintain finish and size to the most exacting specifications. These characteristics have brought ideas into mass production that were once confined to the toolroom. Consider the Rivett 918 for finishing rough blanks or for producing from bar stock.

Write for Bulletin

## RIVETT

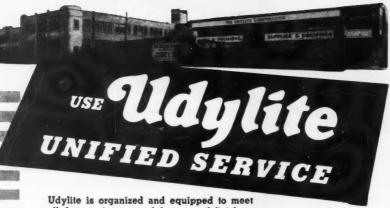
RIVETT LATHE & GRINDER, Inc.

BRIGHTON

BOSTON

MASS

U. S. A.



all the requirements of those metal finishers engaged in electroplating, anodizing and polishing. This unified service **INCLUDES:** 

#### **EQUIPMENT & SUPPLIES**

Regardless of what equipment, controls, supplies or chemicals you need, Udylite can supply you.

#### LABORATORY SERVICE

Udylite maintains a completely equipped service laboratory, in charge of experienced electrochemists, to test your solutions periodically in order to keep them at full efficiency—this at no cost to you.

#### ENGINEERING DEPT.

Udylite's mechanical engineering staff is likewise available to design any type of plating equipment to meet your specific requirements.

#### RESEARCH

Udylite's research engineers, working in their own laboratory, are continuously engaged in projects to further the improvement of metal-finishing processes and equipment. Take advantage of their findings.

#### **FACTORY**

Two large manufacturing plants build the standard and special equipment used in metal-finishing.

#### PILOT PLANT

A pilot plant is available to test under actual plating room conditions, any new procedure you have worked out or which has been developed by Udylite's engineers.

You Get All These Advantages
WHEN YOU STANDARDIZE ON UDYLITE PRODUCTS

THE Udylite
CORPORATION

1651 EAST GRAND BLVD.

DETROIT 11. MICHIGAN

OFFICES IN PRINCIPAL CITIES

Se



That's right—4 precision boring bars, each with the exclusive Clark Lever-Lock principle that holds tool bits at extreme end, 4 replaceable precision ground thread tool bits, and 4 boring bits—all packed in sturdy wood box—and all for only \$8.70.

Remember, only Clark Lever-Lock Boring Bars give you small sizes down to ¾ O. D. They have no interfering set screws or bolts, and can bore or thread to bottom of blind hole with full clearance. 15° holding channel in one end, right angle channel in other.

Don't delay - mail the coupon today!



Clark Lever-Lock Bars are held rigidly in standard Clark Parallel Channel Tool Holders without use of adapters



The exclusive Clark Lever-Lock securely grips the tool bit at extreme end of bar.

Write for Clark Cutter Catalog of Adjustable Tool Holders

	***	ı()e	SERVING	
Robe	wH.C	lark	Comp	oany

#### ARTCHEIC ATIONS

SPECIFICATIONS					
Dimensions of Bering Bars		Cutters	Can be used with Clark		
Diam.	Lgth.	Round	Tool Holders Nes.		
3/16	3	3/32	P60R, P61R		
1/4	6	1/8	P60R, P61R, P62R		
3/8	7	3/16	P61R, P62R, P64R		
9.69		2/4	9429 9449		

Extre birs, ground or unground, carbide or hi-sp steel qualitable from stock IMMEDIATE DELIVERY

#### ODDED COURCE

Send No Meney

ROBERT M. CLARK COMPANY Dept. MMS

Please have your distributor of Clark Cutters send me \_\_complete sets of Clark Lever-Lock Boring Bars. Each set consists of 4 Lever-Lock Boring Bars, 4 precision ground thread tool bits, and 4 boring bits, packed in sturdy wood box, for only \$8.70.

Name\_

Address.

\_State\_







m, g;?

G

- · Heavy bronze bearings
- 1" Collet capacity
- 111/4-inch swing
- Double-walled apron
- Large hardened and ground spindle
- Extreme accuracy
- Convenient controls
- Underneath V-belt motor drive
- \* All Steel Bench

... compare a SHELDON S-56 Precision lathe with all other 10" lathes in the moderate priced field, and you'll find more accuracy, more capacity, more convenience, more design, more quality... from any angle just more lathe.

The SHELDON S-56 lathe has a bed length of 56", with rigid T-girted bed with 2 V-ways and 2 Flat ways which are ground and hand scraped to .0005" of both lateral and parallel alignment. Lead screws are cut on the finest Pratt & Whitney "super precision" lead screw machine. The S-56 lathe with 56" bed is mounted on a rigid 5 drawer steel bench which houses an efficient 4-speed (8 spindle speed) underneath motor drive. Each come with full quick change gears, power longitudinal and cross feeds and standard big lathe features.

#### SHELDON MACHINE CO., INC.

4250 N. KNOX AVENUE CHICAGO 41, U. S. A.

**BUILDERS OF GOOD LATHES SINCE 1919** 

### What's Your Whole Problem?

It is done!

Buhr Engineers are available for discussion of retooling. Write us about your problems or send blueprints. We'll give you the correct answer. Buhr tooling on a standard drill press, with a 51 spindle water cooled drill head, bushing plate and clamping fixture for holding ten parts. Special compound indexing table permits positioning parts to 65 different stations for drilling 4,590 1/4 inch holes in an aluminum aircraft cooler plate. Safety features prevent drills from feeding down until index table is locked in place by plunger.

This machine is practically frictionless. Illustration shows man turning one spindle with two fingers, which turns the other fifty and the motor on top.

A pump puts coolant directly on the drills, and shuts off when parts are being loaded or unloaded in the fixture.

ALL GEARS ARE SHAVED AND IN-DUCTION HARDENED FOR QUIETER OPERATION, LOWER POWER CON-SUMPTION AND MORE TROUBLE-FREE PRODUCTION HOURS.

BUHR

MACHINE TOOL CO. 845 GREEN ST. ANN ARBOR, MICHIGAN





ess.

irill

ina

cial nits

staoles

ate.

om

ess.

one

rns

op.

the

in

IN-

TER

N-

REE

N



#### DO YOU CUT THREADS FROM %" TO 314" DIAMETER 1

That is the cutting size range of Geometric Rotary Die Heads. In this range, they provide you with an ideal threading tool — simple, compact, perfectly balanced. No awkward adjusting screws or stop levers.

#### WHAT TYPE OF MACHINE DO YOU USE?

If you use a live spindle machine (especially a multiple spindle automatic screw machine) you will find that Geometric Rotary Die Heads will give precise performance, are easy to use and the chasers easy to re-sharpen.

#### DO YOU THREAD CLOSE TO SHOULDERS?

If so, please note how the chasers of Geometric Die Heads protrude through face plates so they can cut close to a shoulder without having to remove the face plates or making projection chasers necessary.

#### DO YOU CUT COARSE OR FINE THREADS?

There is a Geometric Rotary Die Head (Style KD) for the coarser pitches, and one (Style CK) for the finer pitches.

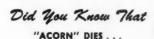
Drop us a card today for booklet on this tool!

The GEOMETRIC TOOL COMPANY

#### The COMPLETE Story

#### of the "ACORN" DIE

In this NEW booklet "Greenfield" tells the complete story of the famous "ACORN" DIE. The booklet graphically explains the 8 basic reasons why "ACORN" DIES are unexcelled and gives complete listings of sizes and prices. For a copy of this new "Greenfield" publication just clip and mail the coupon below or get a copy from your local "Greenfield" Distributor.



- 1. Save set up time
- 2. Give faster performance
- 3. Are longer lived and cut more accurate threads?





GREENFIELD TAP and DIE CORPORATION GREENFIELD. MASSACHUSETTS



Mail coupon for free booklet today!

Greenfield Tap and Die Corporation 10 Sanderson Street Greenfield, Massachusetts

Please send me free of charge a copy of the NEW "ACORN" DIE booklet.

NAME....

ADDRESS

CITY\_

STATE\_

# KNURLING

# HAS TWO Distinct ADVANTAGES

on the head



Pat'd. & Pats. Pend.

Knurling of Socket Screws originated with "Unbrako" years ago.



Reg. U.S. Pat. Off.



on the point

Reg. U. S. Pat. Office

# "UNBRAKO" KNURLED POINT SOCKET SET SCREW

It can't and won't be shaken loose! The knurling of the cup point makes this a Self-Locker, by digging in and holding firm, despite all vibration. Even so, it is easily removed with a wrench and used over and over again.

To learn of our other Socket Screw Products, write for the "Unbrako" Catalog.

# "UNBRAKO" KNURLED SOCKET HEAD CAP SCREW

The knurled head of this screw affords a time-saving, "silp-proof" grip for the fingers. That means it can be screwed-in farther and faster, before using a wrench. Where small screws are needed, the knurled head is especially helpful—saves lost motion. The knurled head also permits locking.

Both of these "Unbrako" screws are available in sixes from No. 4 to  $1\frac{1}{2}$ " diameter—full range of lengths.



STANDARD PRESSED STEEL CO.

JENKINTOWN, PA., BOX 556. Branches: Boston, Detroit, Indianapolis, Chicago, St. Louis, San Francisco
OVER 4C YEARS IN BUSINESS







Brighthey STANDARD

The favorite for burring, finishing, polishing the widest variety of metals and parts.

Brightbay FIRE - TEX
—Smoother, finer texture; for special finlehes are softer metels
in place of the coarser
wheel.

irighthey TUFF - IEX
—Tougher texture fer
pre-polishing and finshing, harder motals.

#### Brightboy GIVES YOU

### RUBBER CUSHIONING A REVELATION IN METAL FINISHING

Eventual production change-over from war goods manufacture presents new work-saving opportunities through rubber-cushioned Brightboy. Brightboy's rubber rubs and cleans. With the abrasive, it gives all-in-one burring and finishing, plus a polish that often serves as the finish.

With new manufacturing opportunities on the horizon, ask your distributor now, for Brightboy catalogs, prices and work data. And contact Brightboy service representatives on your production planning.

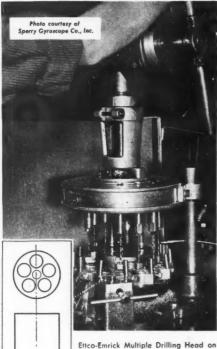
BRIGHTBOY INDUSTRIAL DIVISION, Weldon Roberts Rubber Co., Newark 7, N. J.

A COMPLETE LINE IN 3 TEXTURES,
FOR MANUAL AND MACHINE OPERATIONS



# 500% jump in drilling production with

#### MULTIPLE SPINDLE DRILLING HEADS



Ettco-Emrick Multiple Drilling Head on standard drill press simultaneously rough and finish drilling 5 holes in chrome carbon steel pivots. Rough drill size is 1,20" with 0,05" removed on redrill. The Ettco-Emrick Indexing Fixture, which is tied in with the Head like a punch and die, is a big factor in making fost production possible.

The remarkable accomplishment of the Sperry Gyroscope Co. in producing the vast numbers of gyro-instruments demanded by the war effort, has been made possible by Sperry's skillful organization of production plus the use of time and labor saving equipment.

Among the latter are Ettco-Emrick Multiple Spindle Drilling and Tapping Heads. Typical of the production increases achieved with these Heads is the job illustrated—the rough and finish drilling of 5 holes in a chrome carbon steel pivot.

The production rate on this job, as formerly done on two single drill stands, was 100 pivots per 8-hour shift. With Ettco-Emrick Heads it's 600 per shift—a sweet jump of 500%.

# CONSULT ETTCO on your small parts drilling and

tapping—Ettco-Emrick Multiple Heads assure top production on such jobs. And they actually cost you nothing—because they pay back their purchase price in quick time by their savings in man-hours and machine-hours. Send a drawing or sample part for Multiple Head recommendations.

ETTCO TOOL CO.

598 Johnson Ave., Brooklyn 6, N. Y.
Detroit 1 Chicago 6

Over 25 years specialization in solving Industries drilling and tapping problems

Actual Size



Mew:

le

se

of

non

ly ts

s

12

d

y

ir

nd nd

945

#### WRITE FOR YOUR COPY TODAY

The complete line of Ford Carbide Cutters is described and illustrated in this new 4-page bulletin. All standard styles and sizes are listed, as well as a selective few Carbide Specials which have been made to customer specifications.

Carbides enjoy the distinct advantages of faster cutting speeds, greatly increased tool life, with proportionately fewer regrinds, lower tool inventory, maximum production economy. In actual test they have been shown to outlast ordinary high speed steel by a ratio of fifty to one.

If you are interested in attaining these advantages, write for your copy today.

M. A. FORD MFG. CO., INC.

HAND CUT FILES . GROUND FROM SOLID CUTTERS . CARBIDE CUTTERS

# **For Smoother Performance**



# ATLANTIC Contour Cutting BAND SAW BLADES

You will welcome Atlantic Band Saws in your shop. The teeth are set to permit a smoother performance for radius cutting. The special alloy steel insures longer wear and you can weld them easily.

#### IMPROVED PACKAGE

One of the strongest, most practical and convenient boxes on the market. Cutaway feature shows inventory at a glance.

Box is solid chipboard construction that won't come apart. Saw

securely held in coil form, no bothersome wires to cut. Required lengths freely removable. Marked on end as well as top of box for easy identification. Packed in all widths 3/32" to 1/2" wide in 100' lengths. Number of teeth as permitted by W. P. B. ruling.

Send for Atlantic Band Saw Booklet



#### ATLANTIC SAW MFG. CO., Inc.

Manufacturers of Metal Cutting Band Saw Blades Exclusively
155 Brewery St., New Haven, Conn.

#### WHEN COLLET WORK IS INDICATED - SPECIFY

# Precision Collets

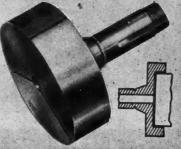
For 10" ATLAS & LOGAN, SOUTH BEND, SHELDON, CRAFTSMAN, POWR-KRAFT, CLAUSING and other important lathes.

#### IMMEDIATE DELIVERY FROM STOCK

The Precision name on a collet is your unconditional guarantee of accuracy in machining, hardening and grinding. Make sure then to specify Precision when ordering from your dealer. Literature on request.

- MODEL 3AT: For 10" Atlas, Logan, 12" Craftsman, No. 700 Powr-Kraft.
- MODEL 3C: For 8" & 9" South Bend, Clausing, Hardings No. 3, 10" LeBland, etc.
- . MODEL IA: For 8" & 9" South Bend.
- MODEL 5C: For 9", 10", 16", 18" South Bend, 1" capacity Sheldon, Schauer, Sebastian, etc.
- MODEL 4C: For 14½" South Bend, ¾" capacity Sheldon, Hardinge No. 4, Elgin, etc.
- MODEL 480: For Logan Screw Machine, Turret Lathe and attachments; Warner & Swasey No. 1, etc.
- BREN Collet: For Handwheel & Lever-Type Speedichuk.

KLUTCH - KOLLET (Step Chuck) for chucking work to 2¾" diameter with collet accuracy. Head unherdened for easy boring. Fits 3AT, 3C, 1A adapters only. List unbored \$7.50 each.



. 5C KLUTCH-KOLLET NOW READY. List Unbored \$10.50.

GENERAL DIE AND STAMPING COMPANY . 262 MOTT ST., NEW YORK 12, N. Y.

945

BREN

480 (AC-50)

3C

Adapters for

**3AT. 3C. 1A** 

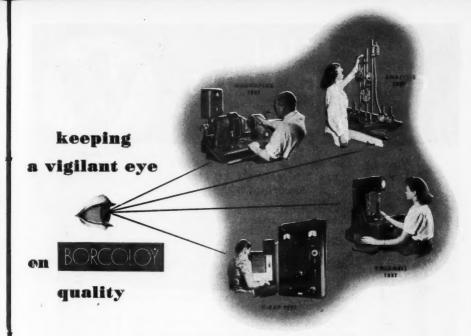
4C



But you must take proper care of them just as you would other highgrade cutting tools.

Use Bath Taps on work for which they are designed — lubricate them — run fast — watch alignment — keep sharp — don't force — never allow flutes to clog — never use a worn-out holder.

John Bath & Company, Inc.



#### ... to bring you tools consistently good

The metal-working industry knows that BORCOLOY tools cut metal faster and cheaper. And—what's more important—the next BORCOLOY tool can be depended on to be infallibly like the last—and for two good reasons.

First, BORCOLOY tools are produced in one of the most modern cutting tool plants in the country, under advanced, scientific methods of manufacturing control.

Secondly, each BORCOLOY tool is subjected — individually — to a series of exacting tests. Each tool is checked for uniformity of composition, for size, shape, and finish; checked again for hardness, magnafluxed and X-rayed to detect infinitesimal surface or sub-surface cracks. Every tool bearing the BORCOLOY name is guaranteed to be of the highest quality.

That's why you can count on consistently higher production between tool grinds from tools of BORCOLOY... the centrifugally-cast ferrous alloy that combines the superior hardness of heat-treated steel (up to Rockwell C-71) with the "red hardness" of cobalt and the wear- and abrasion-resistance of boron.

There's a grade of BORCOLOY for every machining operation in the middle-range fields:

Grade 5 - Where wear-resistance is the principal factor

Grade 6 - For maximum hardness

Grade 7 - For maximum "red hardness" on fast-cutting production jobs.

For a new idea of cutting speed and long tool life, try BORCOLOY tools. Distributors in your area can supply you with BORCOLOY tools—tipped or solid from stock.

\*Registered Trade Mark

#### GENERAL AIRCRAFT EQUIPMENT, INC.-

Tool Division; South Norwalk, Conn.

Branch Offices: Newark Detroit Los Angeles
Oanadian Sales: General Aircraft Equipment of Canada, Ltd., Montreal, P. Q.

# SPECIAL CUTTING TOOLS AND GAGES



#### "The Special Shaving Reamers Used are Interesting as a Means of Securing Quality."

Writes an aeronautical publication of Warren helical reamers (see cut at right) in a recent article on the machining of airplane parts. Describing Warren reamer's finish work this same article states: "Warren helical reamers finish holes in these units, removing from 0.002 to 0.005 in. on a side or adding 0.004 to 0.010 in. to the diameter. The % in. hole is finished glass-smooth with the reamer turning at 90 rpm."

The above and many other favorable comments on our special cutting tools suggest that it may be worth your while to consult our Engineering Dept. in regard to your special cutting problems.

The same accuracy and finish is to be found in Warren Special Gages. We specialize in the more difficult types, such as, flush-pin, snap, built-up and indicator fixtures.



### WARREN INDUSTRIES



WARREN, MICHIGAN

## **Accurate Hob Threading**



For Peace or War Work

RIGHT OR LEFT HAND THREADS

INTERNAL OR EXTERNAL

## COULTER



Write for complete specifications



Any parts that can be held in ordinary chucks, air operated chucks, air operated collet chucks, or special face plate fixtures...can be threaded on this machine.

Set'cam-controlled automatic cycle on first piece. Thereafter, cutter feeds into work to proper depth and at correct pitch and withdraws when cut is completed. Work and cutter spindles are driven by individual motors through worm drive, affording ample power throughout the wide range of feeds and speeds.

The James COULTER Machine Co.

BRIDGEPORT

CONNECTICUT

U.S.A.

## "...Boost Production and Product Quality..."

## NOW — EXPANDED FACILITIES PERMIT 15 DAY SHIPMENT OF URGENT ORDERS

#### CONCENTRICITY

In Low

#### TEN-THOUSANDTHS!

Here's accuracy that automatically offsets an operator's margin of error—without additional skill or time; it cuts scrap, salvage, maintenance costs, tool costs.



### YOUNG ARBOR CO.

3257 Bradford Road
Cleveland Heights 18, Ohio
Phone Yellowstone 9784

Read what Cleveland Graphite Bronze Co., leading bearing manufacturer says about:

## YOUNG PRECISION MANDRELS "ROLLER CLUTCH EXPANSION"

"We are pleased to report that your mandrels have met your every representation. We are particularly impressed with the substantial increases in production and the excellent high accuracy resulting in improved product quality."

#### No More "C" Washers - Wrenches - Drawbars

- 1. Uniform full-work-length friction-locking gives complete control and contact of entire bore surface area
- 2. Repeated replacement of parts in uniformly exact position
- Self-contained, self-expanding, self-locking — instant unloading — interchangeable sleeves
- 4. Built to your bore tolerance limits
- 5. For taper, straight shank, face plate or between-centers mountings
- 6. Any machine operation
- 7. For bore diameters .718 to 5.5.

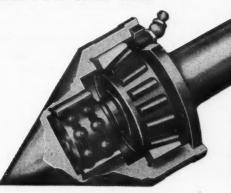
Moderate first cost . . . For quotations send detailed sketches showing part in position.



## ...THE FUTURE...

The future strength and prosperity of American industry depends largely on the efficient use of improved and modern machine tools.

MARVECO is the most EFFICIENT and MODERN Live Center made.



The MARVECO is GUAR-ANTEED to OUTPERFORM and OUTLAST any other LIVE CENTER.

Send us your
Senter problems

Our illustrated catalog will be sent upon request. See for yourselves the MARVELS of MARVECO.

## MARVEL TOOL AND MACHINE CO.

10979 W. JEFFERSON AVE., RIVER ROUGE 18, MICHIGAN

# YOU, TOO, WILL LIKE 'EM





**TOOL CRAFTSMEN SINCE 1869** 

have the stuff!" . . . Try them!

YOU CAN RELY ON BILLINGS TOOLS . . . .

Buy Billings Tools From Your Industrial Distributor

FORGED TOOLS

THE BILLINGS & SPENCER CO.
HARTFORD 6, CONN., U.S.A.

## For Precision Grinding and Sharpening

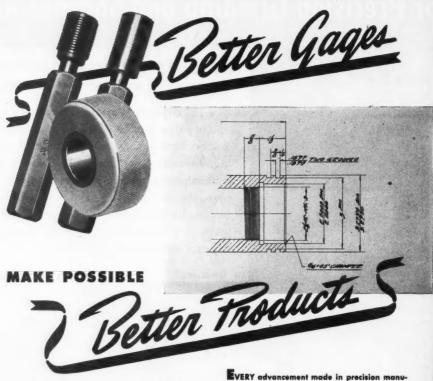


## ROTOREX UNIVERSAL GRINDER

8" x 15" capacity. Variable spindle speeds ranging from 3000 to 6000 R.P.M., making the machine flexible and particularly suitable for delicate grinding jobs. Readily interchangeable attachments for single purpose jobs such as cylindrical, internal, and radius grinding, makes the Rotorex Grinder a universal machine for all kinds of grinding and sharpening operations.

Douglas Machinery
Company, Inc.
150 Broadway, New York 7

PROMPT DELIVERY



EVERY advancement made in precision manufacturing has followed or coincided with an improvement in gaging methods. Extremely close tolerances have been made possible in production only because gages were produced to provide the required inspection accuracy.

Lincoln Park's development and use of Carboloy for gages has made it possible for hundreds of concerns to produce parts to much closer limits than would ever have been considered practical a few years ago. In Lincoln Park Carboloy gages, wear allowance is not necessary. At no time are they "over-size" but are accurate to required limits from the first inspection. They provide the precision which is so essential when a slight variance from accurate gage limits could mean the rejection of many parts that actually should be accepted.

The trend toward even greater precision in manufacturing operations will definitely continue into the post-war years. If you are to remain competitive in your markets, you too, will be producing better products to new standards of accuracy. And, as always, better products will call for better gages such as are now being made—and will continue to be made—at Lincoln Park.



# PRECISION BUILT PUMPS

- For Many Requirements -LUBRICATION-TRANSFER-COOLANT HYDRAULIC INSTALLATIONS

500 Series Pump Shows. Six sizes. For pressures up to 500 lhs.

CENTRIFUGAL

Catalog sent on request

Providence I, R. L. U. S. A.

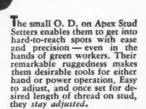
Mr. word land to the make the Distributes

BROWN & SHARPE



# easy

with Apex Stud Setters



Four sizes cover a range of studs up to 1½". You can have Morse Taper, Hexagon, or Thandle shanks. Also female square or Thandle combination with female square drive for use with impact or torque wrench. Types to fit any make of power tool. Made to customer specifications when requested. Send for Bulletin 101.

APEX-DAYTON-OHIO

## APEX

The Apex Machine & Tool Co., Dayton 2, Ohio

Manufacturers of Safety Friction Tapping Chucks, Quick Change and Positive Drive Drill Chucks, Vertical Float Tapping Chucks, Parallel Floating Tool Holders, Power Bits for Phillips, Slotted Head and Clutch Head Screws, Hand Drivers for Phillips and Clutch Head Screws, Aircraft and Industrial Universal Joints, Plain and Universal Socket Wrenches.

pro hav

No due pro ted ital con tio latl NE ity,

Yo

wit

me equ

ass

do

# RECONVERSION

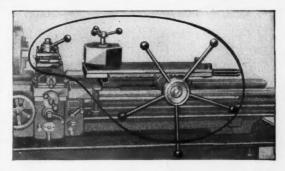
## IS COMING RIGHT AT YOU . . .

Competitive selling is just around the corner—that will call for speed and maximum efficiency in production. If part of your problem is to get turret lathe production out of those "part time" engine lathes—or if wartime schedules have worn out the efficiency, accuracy and speed of your turret lathes,

## SEE WHAT YNN

### CAN DO FOR YOU ...

Now you can put your idle or unproductive lathes back into profitable production at once. No delays, no tedious over-hauling, no large capital investment . . . LYNN provides complete equipment for re-conditioning or converting your present lathes—gives you the equivalent of NEW TURRET LATHES in capacity, accuracy, speed, range of work.



## Reconditions Turret Lathes Overnight

Your worn or inaccurate turret lathes and crew machines can be expertly re-conditioned without leaving your plant or interrupting production. Simply use LYNN units as replacements. The illustration above shows a turret lathe that has been reconditioned with LYNN equipment, including Self-Indexing Bed Turret. Quick mounting and perfect alignment is assured because turret bases are machined at factory to fit your particular make of lathe.

#### Converts Engine Lathes for Turret Work

The practical, economical solution for short-run production. Easily, quickly mounted, LYNN turret units enable your lathes to handle multiple operations comparable to those done on turret lathes and screw machines—eliminating time-consuming and expensive tooling up.

LYNN manufactures a complete line of bed turrets—in addition to tool post turrets, cross slides, Lathe Legs and Splash Pans, and other equipment—for every make and size of standard lathe.

Tested and proven in exacting war production throughout the nation...LYNN equipment may very well provide the answer to your particular production problem.

Write for Complete Information Today...or Consult Your Jobber

YNN MANUFACTURING CO. 220 ELROY STREET



THE NEW BOND THAT HOLDS ITS OWN . . . GIVES ONLY WHEN IT MUST!



From the swift era of war production comes another modern miracle, the cut-off wheel—man power and man hour saver—for the fastest, smoothest method of cutting tubing, wire, steel and brass sheets, glass, porcelain, Stellite, tungsten, plastics, laminates and other hard-to-slice materials.

When RT, the special formula bond was developed, it put the cool-running CHICAGOS 'way out in front in real performance records.

Available in rubber or resinoid — a full range of styles and sizes. 3 bond types—for every operation.

WANT TO TRY ONE? Tell us what you have to cut, grinder you use and size wheel you'd like. We'll send a test wheel promptly. Write for Circular.

#### CHICAGO WHEEL & MFG. CO.

Originators of the famous Chicago Suft Rubber Polishing Wheels

1101 W. Monroe St., Dept. MM, Chicago 7, Ilinois

Send Circular. Test Wheel. Size\_\_\_\_To Cut.

Name

Address

## 1 EMPIRE LIVE CENTER DOES MANY OPERATIONS



- A. Very large, for pipe or tubing work
- B. Extra long point used in facing operations
- C. Extra wide point for large diameter work
- D. Standard point
- E. Blank made of soft tool steel for nests
- F. Female for work not having centers

on of few graded.

ECONOMY—As compared with dead centers, application of an Empire Live Center will return its original cost in a few weeks. Burnt-out and scored center holes are eliminated. Work is turned at higher speeds; heavier cuts are made.

VERSATILITY WITH ACCURACY — Points and case are threaded and have matched tapered seats. When a point is needed for an operation, it is tightened on the case. Perfect alignment is obtained by the matched tapered seats. Tension of the threads maintains this perfect alignment.

LUBRICATION—By removing point, the Empire Live Center may be greased through the opening. When point is replaced, bearings are positively sealed against all foreign matter.

BEARINGS—Empire Live Center uses a precision, double row, pre-loaded bearing. It is a combination bearing absorbing both radial and thrust loads. It is heavy-duty—no play.

#### MAIL THIS COUPON TODAY!

ROYAL PRODUCTS, 69 Spring St., N. Y. C.

Send me literature describing the Empire Live Center and Toolmaker's Set.

NAME

FIRM

TITLE

ADDRESS

SOLD ONLY THROUGH SELECTED DISTRIBUTORS



## Empire TOOLMAKER'S SET



The Toolmaker's Set consists of an Empire Live Center with a complete set of points which have been ground on this center. These points are made of tool steel;

they are interchangeable and are used for various operations. The set includes a wooden case which is handmade and rubbed to a fine finish. Each tool fits snugly into its own recess . . safe and readily available when needed.

For convenience and utility, we recommend the Empire Toolmaker's Set. Available in seven standard sizes. Special sizes made to specifications.

Manufacturer's Representatives— Some Territories Open

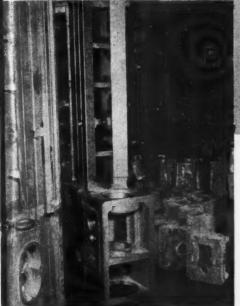


69 SPRING ST.

September 1945

Spe

# RIGIDITY



For HIGH SPEED TURNING of HIGH BRINELL STEELS

 Lipe's rock-like rigidity, coupled with Lipe's smooth-flowing power give rough-grinding accuracy at the carbide-tool speeds that postwar competition will require.

NOTICE how the massive bed and headstock are cast in one piece, providing extra strength and resistance to torsional stress.

NOTICE how the heavy sidewalls of the bed are reinforced by cross ribs properly spaced for maximum strength, insuring high resistance to torsional stresses and strains.

NOTICE the massive bulk of the tailstock, adequate to hold high-speed centers without deflection or vibration.



Ask your nearest distributor for detailed information, or write for specifications and performance data to

IPE-ROLLWAY CORPORATION SYRACUSE, N. Y.

Special Industrial Machinery Since 1875



## LIPE

Carbo-matic Lathes

fully-hydraulic operation with 264 changes of spindle speed; low-gear 62 to 1046 r.p.m.; high-gear 600 to 3600 r.p.m.; swing over carriage 8", between centers 30".

Set

SET

comhich on oints tee!; I for es a rubugly

vailsizes

dily

ST.

945



No. 1460, the with pad for abrasive discs. Se made it is widely used in auto body and metal furniture plants.

# CLECO VERTICAL ROTARY GRINDERS

- FOR: √ grinding
  - √ polishing
  - √ brushing
  - √removing rust, paint, scale, etc.



No. 1845 fitted with abrasive wheel and adjustable wheel guard, which protects operator if wheel breaks. Used for surfacing steel sheets and bors, cleaning up welding operations, etc.



No. 1460, fitted with cup wire brush (supplied at extra cost) for removing rust, scale, paint from metal surfaces preparatory to repainting.

Type of flexible pad, disc holder and abrasive disc used with these Cleco Grinders.



### IMPORTANT FEATURES

- \* Tool automatically shuts off if governor breaks—an important safety feature.
- \* Governor set so that at 80 lb. gauge pressure it holds grinder safely at its most effective speed.
- \* Rugged rotors, heat treated and ground to exact size, insure vibration free operation.
- \* Air is admitted under each blade throughout its power sector—immediate starting even under load.
- \* Efficient lubrication system increases tool life.

#### SPECIFICATIONS

No.	Speed	Weight	Capacity Diam. of Flexible Pad	Diameter Elastic Bonded Cup Wheel	
1845 1860 1460 1480	4300 R.P.M. 5800 R.P.M. 5800 R.P.M. 8000 R.P.M.	12 lbs. 12 lbs. 8¼ lbs. 8¼ lbs.	9" 9" 7"	6" 4" 4"	

Write for Bulletin 80!

THE CLEVELAND PNEUMATIC TOOL COMPANY

3781 EAST 77th STREET

CLEVELAND 5, OHIO

Branch Offices in Principal Cities



## You don't need to put up with RUST

RUST COSTS AMERICAN INDUSTRY WELL OVER \$100,000,000 A YEAR!

How much of that sum could you save if rust were eliminated in your plant?

Cities Service Anti-Corrode and Cities Service Rust Remover quickly and safely effect substantial savings...help insure your production.

Cities Service Rust Remover wipes metals clear of rust or tarnish formations. Easy to apply—acts quickly and effectively.

Cities Service Anti-Corrodes prevent rust...provide safe and durable protection against rust or corrosion. There is a specific Anti-Corrode for every industrial need.

Talk over your rust problems with a Cities Service lubrication engineer and let him suggest methods for their solution. You will benefit immeasurably from his expert knowledge of the subject. Write now or mail the coupon below.

Rust can be eliminated . . . and Cities Service can help you.

Mail this Coupon Today...

faces

reaks

are it

out its

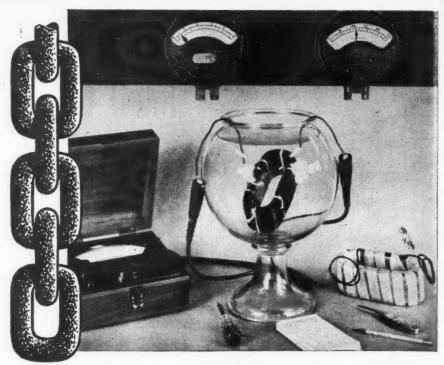
load.

life.

HIO

City.....State.....





### NO CHAIN IS STRONGER THAN ITS WEAKEST LINK!

- I. No chuck is better than its coil.
  - No coil is better than its wire and insulation.

    The coil must be made of high grade wire and extra quality insulation; unless this is carefully specified and held to rigid inspection, no after treatment can or will improve the coil.
- 2. Coils must breathe to dissipate energy.
- Studies and countless laboratory tests lead to conclusions that revert to these basic principles.

O. S. WALKER CO. — the original chuck builders, accepts the modern challenge and sets the pace for the advanced production methods of tomorrowl

## O. S. WALKER COMPANY, INC. \* WORCESTER \* MASS. \* Makers of Rectangular, Swivel and Rotary Magnetic Chucks

D RAPIOS

& DRILL GRINDERS



OTHER COMBINATIONS ALSO AVAILABLE

GRINDS TAPS No. 6 to 11/2"

Full Description IN BULLETIN GL-9-15-44

**GALLMEYER & LIVINGSTON** 

308 STRAIGHT AVE. S. W.

GRAND RAPIDS 4 MICHIGAN



The job on the 48" Rockford Hy-Draulic Openside Planer shown above would be a "toughie" to plane economically without this handy machine. The work consists of a pair of 84"-long cast iron saddles that have dovetails and bearing surfaces on opposite sides and at right angles to each other. Planing the saddles lengthwise is easy for any good 48" planer... and this Rockford Hy-Draulic Openside does a fine job on both saddles successively.

Planing the other side of these castings would require a larger and much more costly double-housing planer. On the 48" Hy-Draulic Openside the job remains easy because the castings can overhang the planer table 40" or more, on the "open" side, without interference. Planing both sides of both saddles takes only 29.7 hours floor-to-floor. This is really "taming a toughie," considering the amount of planing, number of tool-settings, accuracy, high quality of finish and set-up time required.

Rockford Hy-Draulic Openside Planers are made in four capacities and in various lengths up to 20 feet. They do first-class work on all ordinary planing and "tame" lots of "toughies" besides. Investigate these Rockford Hy-Draulic machines to-day. Write for Bulletin 1624.

#### ROCKFORD MACHINE TOOL CO., ROCKFORD, ILLINOIS









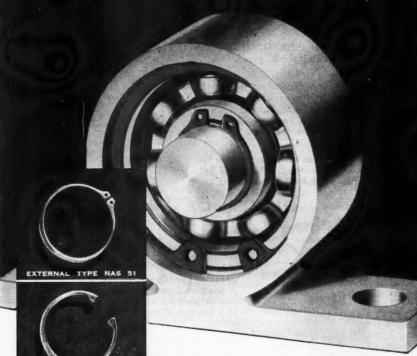






WALDES

# TRUARC



Waldes Truarc expands or contracts without distortion and without permanent set, fitting tight all around the groove. It offers important advantages over shoulders, nuts, collars, etc., for all thrust-load

fixings in shaft and housing applications. It saves space, weight, assembly time and machining costs. Waldes Truarc presents a significant advance in retaining rings, well worth your thorough investigation. We will gladly furnish samples and full data for tests, upon request.

. INTERNAL TYPE NATIONAL AIRCRAFT STANDARD SO . EXTERNAL TYPE NATIONAL AIRCRAFT STANDARD ST



INTERNAL TYPE NAS 50

WALDES KOHINOOR, INC. Long Island City 1, N.Y. Canadian Representatives: Pronce Progress & Engineering Corporation, Ltd., 72-74 Stafford Street, Toronto

## OLIVER of Adrian Die Making Machines

WILL SAVE YOU 50% TO 60% OVER

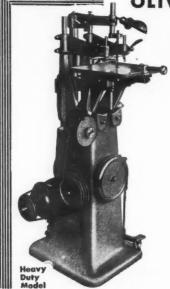
hand methods on your DIES, GAGES, Cama. Templates, Experimental Work, etc.

The one machine you cannot afford to be without on your conversion program. It not only saves expensive labor, but produces better work on time. Let us tell you more about the saving possibilities of this machine.

Cut illustrates S-1 model for 1" materials. Efficient and fast on all Sawing, Filing and Lapping Operations. (Prices as low as \$125.)



OLIVER OF ADRIAN



The Heavy Duty Model illustrated is a pedestal machine for 3" materials. It is equipped with adjustable stroke device — variable speeds — 14" table — hydraulic feeding device — foot operated clutch — light fixture.

A tried and proven machine that will enable you to produce both large and small die work at a fraction of the cost.

When in need of Die Making Equipment or a machine for production sawing or filig—Remember Oliver of Adrian and avoid those cheap substitutes. The Original Oliver is priced within the reach of every shop—A Model for every purpose. Files, Saws and Lapping sticks in stock for use with all models.

#### OLIVER INSTRUMENT COMPANY

1430 E. Maumee St. Adrian, Mich.

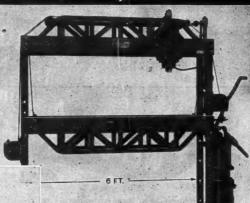
We also build Drill Grinders, Tool and Cutter Grinders, Face Mill Grinders, Template Tool Bit Grinders.

let us rend bulletins, giving full information as

## They can do everything but cook"

THAT'S THE WAY
ONE PRODUCTION
MAN EXPRESSES
HIS OPINION OF
KRW HYDRAULIC PRESSES

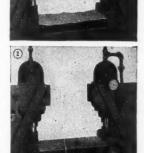
Adapted as a SHEET METAL STRAIGHTENER. This unit consists of three heads on a special frame. The two upright heads grip the metal sheet. The horizontal head quickly removes kinks by stretching. This unit combines Hand, Air and Electric-Oil operation. (Any one can be used independently).



This special adaptation was built to STRAIGHTEN ARMOR PLATE. The entire ram head mechanism slides the full width of the head frame so ram can be positioned over a "high spot" on the plate. Distance between uprights, 6 feet. Air-Oil and Hand operated.

• Standard KRW Hydraulic Arbor Presses are made in 25, 50, 60 and 75-ton capacities and provide the utmost in speed, efficiency and versatility. For unusual applications, special presses—at slight additional cost—can be engineered to exactly fit any special problem. Any KRW Press can be equipped for Hand, Air-Oil or Electric-Oil operation. Many special presses combine these methods of operation in order to provide greater efficiency.

Bring your Hydraulic Press problems to KRW. In more than one instance we have been able to design, build and ship a specially-designed press in a matter of weeks that did the job better, faster and cheaper than costly, hard-to-get equipment. Write for descriptive Press Bulletin. K. R. Wilson, Dept. 16, 215 Main St., Buffalo 3, N. Y.



th

ot

ae.

is

d.

10

h.

45

gripped by the two vertical heads. Illus. No. 2 shows the sheet after being "stretched" flat by pulling pressure of the horizontal head.

Illus. No. 1 shows "kink-

ed" sheet metal as it

comes from the rollers.

SEND FOR THIS 24-PAGE ILLUSTRATED HYDRAULIC PRESS CATALOG . . .





K. R. WILSON BUFFALO 3, NEW YORK Finer Finish
Tolerances to .0005
WET-BELT
Tolerances, this is demonstrated performance

... often on jobs that are headaches to the production engineers who've sent us sample pieces for try-out.

### SURE—we welcome these HEADACHES

... they've helped to give Porter-Cable Wet-Belt-Surfacing its fine reputation in shops all over the country. But . . . . . .



**BG-8 Wet-Belt Surfacer** 

Automatic, precision-controlled

hydraulic feed. Handles single

pieces or gangs with extremely

simple fixtures. Loading and

unloading time cut as much as

45%. Other models for semi-

automatic and free-hand ap-

— many of you shop men are missing something, because the greatest savings by this new method have always been shown by —

## Demonstrations on Simple, General Run of Surfacing Jobs

... often the kind which you may think can't possibly show further cost reduction.

**SO,** we'll do this for you . . . without obligation or cost. Preferably, you send us your drawings — or a really representative selection of parts — complete with machining specifications. Our methods engineers will make a thorough study and point out where Wet-Belt Surfacing will do a profitable job — in terms of time-saving, cost-cutting and improved finish that are likely to surprise you.

WRITE US TODAY that you are sending drawings — or parts in any machinable material — and ask for complete production report for your comparison with present methods. You'll feel repaid for your time. Remember, No Charge, No Obligation.

PORTER-CABLE MACHINE COMPANY

300-9 Wolf St., SYRACUSE 8, N. Y.

MODERN MACHINE SHOP

00

plications.

September, 1945



Here's How to Predetermine the Results of **Applying Cold Treating to Your Production** 

It is highly possible that by employing the same procedures and equipment, identical and in many cases better results can be attained in your plant. You can predetermine the results of applying it to your production by contacting Deepfreeze. Engineering Service.



#### FREE...Complete History of Cold Treating

This new Deepfreeze booklet contains up-to-theminute data on Cold Treating... the important points of development from its inception down to the present time... actual performance stories and their results... tested procedures, in detailed form, and numerous additional data of interest and value to you. Your copy will be sent upon request.



m

ly

## "Seek and De Shall Find"



A high grade Tool Room or Engine Lathe must be designed to do all tool room work within its capacity, and also produce the finest gage work quickly and accurately—but then what?

Here at Hendey, we have always felt that the *simplification of controls* was almost as important as the machine itself. That's why we did something about it years ago. That's why you can always spot a Hendey Tool Room Lathe operator. He's satisfied because his machine has a *minimum* number of operating levers—every one within easy reach; every one actuated by a "natural motion." It all adds up to an easier, more productive, more profitable day's work for him and you too.

Hendey has taken care of maintenance points in the same way. Wherever possible, oil reservoirs are used. The carriage apron is entirely enclosed, even to the rack pinion. Access doors are provided where necessary, but don't swing so wide as to take three times the floor space required by the lathe itself.

Yes, "We're agin" Biblical "Seek-and-Ye-Shall-Find" methods. You will be too—after trying a Hendey on your tool room and engine lathe jobs.

#### The Hendey Machine Company

Main Office and Plant - Torrington, Connecticut

Branch Offices — New York, Chicago, Boston, Detroit, and Rochester
Representatives in — Phila., Cleveland, Los Angeles, Pittsbyrgh, San Francisco







## Automatic WORK STATIONS through ONE cycle of the DIAL

There's no need today to employ several machines and a group of operators when a single Bodine multi-spindle dial-feed unit will perform up to eight different operations on one piece during a single cycle of the automatic indexing dial.

Thousands of small parts are accurately machined per hour... many thousands per duy... by quickly trained operators... men or women.

**OPERATION:** The operator places-the work in fixtures on the horizontal dial as it automatically indexes. 6 to 8 spindles located for milling, drilling, tapping (and, in some cases, screw inserting) can operate from vertical, horizontal, diagonal or inverted positions . . . tapping and drilling to  $\frac{1}{2}$ " dia. and  $\frac{2}{2}$ " in depth. Ejection is either automatic or manual, depending upon the nature of the part. Automatic feed is also possible. Electrical interlocks protect the machine, the tools, the work and the operator.

Added features are: Low fatigue factor for operators... clean, simple work for older men and women employees. Bodine machines now used in war work may be retooled without delay or undue expense for civilian production.

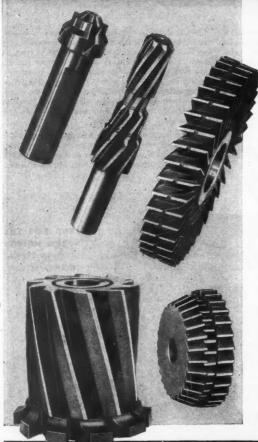
# DRILLING, MILLING, TAPPING, SCREW INSERTING Timultaneously

For instance: One of the almost limitless set-ups on a Bodine machine produces 7 pieces per minute with 7 different operations on each piece. This means a saving of 75% in manpower, conservation of about 50% in floor area, over previous methods.

There are six sizes of Bodines which carry from 6 to 8 spindles... floor area from 54" x 60" to 90" x 96".



## PRECISION TOOLING



# To Beat the Japs or Solve Your Postwar Problems

The Pacific war is still making heavy demands upon all of us.

But you, undoubtedly, are looking forward to resuming the production of civilian goods.

And we are ready to bring our war-won experience to your postwar tooling problems.

Send your inquiries to our engineering Dept. for prompt estimates.

AMERICAN CUTTER
AND ENGINEERING CORPORATION
31743 MOUND ROAD - WARREN, MICH.

BUY MORE WAR BONDS-HELP CUT DOWN THE JAPS

A.C.E.

SPECIAL CUTTING TOOLS

HI-SPEED OR
CARBIDE-TIPPED

# A 'WAR VETERAN' with a distinguished Service Record

Long before Pearl Harbor, Dremel MOTO-TOOL won its spurs by the way it tackled tough jobs in tool rooms and machine shops, and on production lines. But since American industry swung its full strength into war production and our armed forces established far flung assembly and repair bases the already healthy demand for these mighty little midgets has quadrupled.

П

ın

e

g

ur pt

N

CH.

945

Operators as well as owners of Moto-Tools are constantly discovering new jobs... new ways to save time and cut costs... with these pocket size machine shops. Girls quickly become proficient in the use of them because a Moto-Tool weighs but 13 ounces, is shaped to fit the hand, has a balanced armature to prevent vibration. Thousands of Moto-Tools are helping to establish production records in plants such as General Electric, Westinghouse, Remington Arms, Ford, Nash-Kelvinator, Consolidated Aircraft, Northrup, Douglas, and many others. Besides, Moto-Tool has won the respect of every branch of the U.S. Jand, sea and air forces.



A FEW OF THE MANY JOBS THAT CAN BE DONE BETTER AND FASTER with MOTO-TOOL Sharpening 8urring Cleaning . Finishing Grinding Routing Touching-Up Polishing Cutting. Burnishing Rasping Sanding Drilling Inlaying Carving Mortising Sawing Brushing ☐ Engraving ☐ Scoring ☐ Bressing

A Model 2 Moto-Tool develops 27,000 rpm...the proper speed for clean, smooth, accurate work, and long life from points and cutters. It is sturdily built throughout and has a shock-proof bakelite housing and oil-less (oil sealed) bearings. Uses 110-120 volt AC or DC current. Ask your Mill Supply salesman about Dremel Moto-Tools and accessories. If his firm does not carry them write factory or nearest Dremel representative. Prompt shipment on orders with proper priority.

DREMEL MANUFACTURING CO.
Dept. T-225-J Racine, Wis.

Federated Sales 2437 W. Valley Alhambra, Calif. Mill Factor Products 53 W. Broadway New York, N. Y. F. W. Fowler 137 Federal Boston 10, Mass. J. J. Backer 2321 Second Ave. Seattle, Wash.

## **IDEAL SPEED LATHES**

For accurate, uniform, speedy finishing of metal & plastic parts.

every secondary finishing operation—polishing, de-burring, lapping, grinding. For lower-cost peacetime production, write or call your nearest Schauer representative:

Colcord-Wright Mchy. & Supply Co. 1223 N. Broadway, St. Louis 6

Eichman Machinery Company 235 W. 8th St., Kansas City 6

The E. L. Essley Machinery Co. Chicago 22 Milwaukee 3 Grand Rapids

Federal Sales & Engineering Co. Transportation Bldg., Washington 6

Goodspeed-Detroit Company 2832 E. Grand Blvd., Detroit 11

The C. H. Gosiger Mchy. Co. Dayton 2, Ohio

Harron, Rickard & McCone Co. Los Angeles 11 San Francisco 10

The E. A. Kinsey Company 311 W. 4th, Cincinnati 2

Marshall-Huschart Mchy. Co. C of C Bldg., Indianapolis 4

Motch & Merryweather Machy. Co. Cincinnati 2 Cleveland 13 Pittsburgh 22

The Satterlee Company
118 Washington Ave., N., Minn. 1

W. E. Shipley Machinery Company 1421 Chestnut St., Philadelphia 2

Syracuse Supply Company Syracuse, Buffalo, Rochester

Triplex Machine Tool Corporation 125 Barclay St., New York 7

W. W. Wentz 121 Powers Hotel, Rochester, N. Y.

Williams & Wilson, Ltd., Canada Toronto, Montreal, Windsor, Quebec



5

CHAUER MACHINE

ORIGINATORS OF TODAY'S SPEED LATHES



No. 5-18"-L

### **BESLY** GRINDER

for Light Production or Tool Room Use

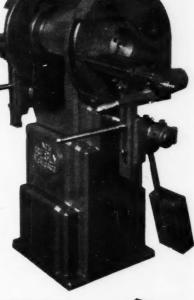
Almost any tool and die shop will find constant use for a Besly No. 5 Disc Grinder—and soon wonder how they ever got along without it.

The No. 5 handles a large variety of production work, produces accurate surfaces, fast at remarkably low operating costs.

Spindle, mounted in ball bearings, carries 18" bolted-on abrasive discs. Equipped with the famous Besly "geared lever feed table," this general utility grinder will provide real economies. Write for full information today.

#### **Prompt Shipment on First Orders**

A very limited stock of No. 5 Grinders is available for immediate shipment. Write, wire or phone you order today. We will advise you at once if shipment cannot be made promptly.



#### GET THIS BOOKLET ...

Write for it today—on your letterhead. It's a valuable reference on grinding wheels and abrasives. Besly-Titan STEELBACS speed production.

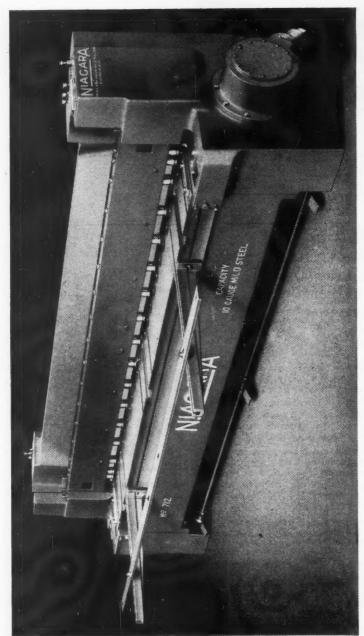


BESLY

BESLY GRINDERS AND ACCESSORIES
BESLY TAPS • BESLY TITAN ABRASIVE WHEELS

CHAS. H. BESLY & COMPANY, 118-124 N. Clinton St., Chicago 6, ill. . Factory: Beloit, Wis.

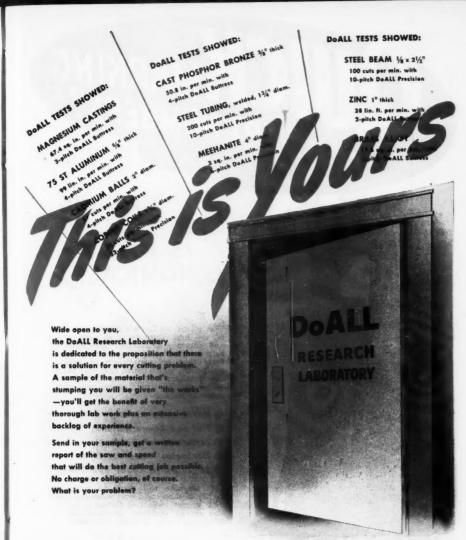
1945



Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory grinding service by the same skilled men Niagara knives.

who grind new

More production per hour on shearing long sheets is made possible by the advanced design of Niagara Power Squaring Shears. Features include accurate, flat cutting; convenient handling of stock and offcut; more working strokes per hour; instantacting 14-point engagement sleeve clutch; gears mounted between anti-friction bearings; clutch and gears operate in oil-tight case; self measuring, ball bearing, par-allel back gage. Write for Bulletin. Niagara Machine & Tool Works, 637-97 Northland Ave., Buffalo 11, N. Y. District Offices: Cleveland, Detroit, New York. September, 1945





Centeur Sawing	Band Filer		-			-	_	
Baltimere SA 5776 Birmingham 3-850 Boston ASP 888	02 Bayton 69 Beaver		The	<b>D</b> 6	AL	L-G	mpa	1
Buffalo PA 66 Chicago SEE 11		TE 2-3068 MAIN 7848					Sales an	
Cincinnati MAIN 31 Claveland EX 11		pids 8-8922 6-7296	Houston Indianapolis	C 8588 LI 9957	Kaasas Cit Los Angola	9 HA 5857 8 TR 3871	Milwauken Minneapolis	81

**Des Plaines** Salt Lake City 3-9074 San Francisco &A 4784 Souttle EAST 7508 Philadelphia VIC 2318 Pittsburgh AT 3386 Pravidence W1 1515 Reading 7258 Statesville 518 | Service Store | Hockester CUL 174 | HO 5950 | New York | HOU 4-1514 | Reckford | MAIN 227 | RL 1173 | Urlando | 6056 | St. Louis | CE 3021 3-7212 Syracuse Toledo AB 8472 4-8841

Rillia

Niagara knives.

n 3 Z

works, 65/-9/

Bulletin. Niagara Machine & 1001 Wor N. Y. District Offices : Cleveland, Detroit,

for Write Buffalo

gage.

allel back a

945

Illinois

Service Store

# CAMARKING MARKING FOR PART NUMBERS!

MODEL 175 HYDRAULIC



War plants are finding this machine one of the best investments in time-saving and accuracy obtainable. Inexperienced help is able to turn out perfect markings every time on components of military equipment; which means that your peacetime products will be able to keep pace with the expected highly-competitive post-war markets.

- Rapid and Accurate
- Flat and Round Surfaces
- **●** Lettering and Graduations
- **■** Eliminates Noise and Errors
- Saves Parts, Labor and Stamps

This machine will mark an unlimited variety of shapes and sizes when equipped with proper tools and fixtures. It will also do an excellent knurling job on solids and shells of small diameters.

Designed and Built by



GEO.T. SCHMIDT, INC.

1806 W. BELLE PLAINE AVE. CHICAGO • 13 • ILLINOIS

## Behind the eight ball with Production Problems



Because "eight balls" loom large in front of every production man at times .... SYNCRO has developed a specialized service to remove such obstacles. SYNCRO specializes in tough engineering-production problems and in the manufacture of precision machined tool products for Victory and after Victory. Consult SYNCRO now—without obligation.

SYNCRO DEVICES, INC. FERNDALE 20, MICHIGAN



Manufacturers of Precision Machined Products

# the Time Consuming ELEMENTS in Short Run Piercing

Don't stop long run jobs to set up for short run piercing jobs. A Wiedemann Turret Punch Press can do it with greater accuracy... at long run low cost.

Don't interrupt long run production to make 1 or 10 or 100 pieces of a kind, panels, chassis, outlet boxes, special gaskets, clouvres, copper buss, and other pierced sheet metal parts. Use a Wiedemann!

# WIEDEMANN Simplifies

## EVERY COSTLY PIERCING OPERATION

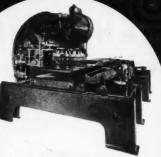
- \* Layout time is completely eliminated or greatly reduced because of easily operated material positioning gauge tables . . . only one man is needed to handle the largest sheets in the press.
- \* Conventional equipment takes 15 or 20 minutes to change punches and dies. With a Wiedemann, punches and dies operate on an easily rotated turret . . . a few seconds is all that is required to rotate turret from one punch to another.
- \*11 to 32 dies at your fingerlips for instant piercing ... all dies are locked into position by means of index pins after correct dies are located on turnet.
- \*No sheared punches or dies from inaccurate set-ups...holes are punched clean.
- \* No waiting for die set-up man. A Wiedemann is always ready to run without tearing down any set-up.
  - \*Long run jobs can be started on your Wiedemann while production dies are being made.

Send today for Wiedemann Bulletin No. 92 to get the complete story of Short Run Piercing Economy.



1821 SEDGLEY AVENUE





With a Wiedemann Type R-7, punching is done either directly from blue prints or from charts without any layout work being necessary, merely by turning two handwheels to obtain accurate X and Y coordinate settings.

coordinate settings.

This high speed positioning of material is accomplished on a ball bearing spacing table for sheets up to 50" wide by 100" long. Any point on sheets up to 100" long. Any point on sheets up to 100" long. Any point on sheets up to 100" long. Any point on sheet the punching station for plercing openings, or making louves or knock-outs.

or making rouvies or another outs.
There are no stops to set . . . from
12 to 32 stations operate on an easily rotated turret for instant piercing.
Changing from one punch to another
is a matter of seconds . . . practically
instantaneous.



The R-4P Power Driven Turret Punch Press is furnished with 12 punches and dies up to 1½" diameter, mounted in a revolving turret. An accurate, positive indexing device locks the revolving turret, when the punch and die selected for use are located centrally under the ram. This locking and unlocking is done by a small lever shown on the by a small lever shown on the remaining the present of the machine; this lever belg index present operation when the machine unless the further is properly positioned and the index lever locked in place.

# Greater Versatilitu

WITH THESE GEMCO SHAPER ATTACHMENTS

SUPPLEMENTARY TABLE Its use increases range, and 113 USE INCREASES FANGE, which size of work Pieces which can be handled. THE STATE OF THE S

Used for angular work pieces, thereby eliminating

complicated set-ups.

In 16", 20" and 24" Sizes Its use makes possible the surfaces otherwise inaccessible. When used soal head hady

Used for dividing operations required in splining, fluting, gear cutting, and squar-

the both the second second second ing shafts.

Down Feed to Head **Double or Single Screw Vise** Mould Maker Vise **Power Rapid Traverse** 

GENERAL ENGINEERING & MFG. SAINT LOUIS 4, MISSOURI

in conjunction with special tool head body. in conjunction with special tool head body, concave attachment, and power down. reea mechanism, concentric co.
Surfaces can be machined

**Multi-Purpose SHAPERS** Exclusive "LUBRIGARD" Safety Device Increases the Precision Life

MANUFACTURERS OF PRECISION MACHINERY SINCE 1917

Write today for Bulletin GC-12S

# This thinner Blade cuts down metal waste



Only .032" thin, the blade in the Johnson Metal Cut-off Bandsaw cuts straight and true—and economically. Loss of expensive metal is held down to less than 3/64" per cut! That's performance that makes sense and savings.

#### Other Important Johnson Features

- 1. 3-point base insures even cuts
- 2. Box type frame protects movable parts
- Four speeds provide right speed for every metal, hard or soft
- 4. Hydraulic control insures even pressure throughout cut
- 5. Coolant attachment minimizes friction, prolongs blade life
- 6. Automatic shut-off after cut is completed

WRITE TODAY FOR FULL DETAILS

## JOHNSON MANUFACTURING CORP.

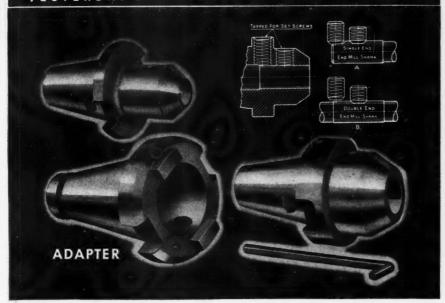
5000 CHRYSLFR BLDG.

NEW YORK 17, N. Y:

106 MODERN MACHINE SHOP

September, 1945

#### YESTERDAY'S PIONEER . . . TODAY'S LEADER



#### WELDON Adapter and End Mill Holders

To speed production and insure precision cutting, WELDON originated the type of Adapter and End Mill Holders shown here. The Holders grip the end mill with absolute rigidity to give positive drive without "chatter" or "run-out". The Adapter permits quick and easy change from one size holder to another without loosening the spindle draw bar. Accommodates



ic-

m.

both single and double end mills in shank diameters of seven sizes. These are stock items designed and built to the WELDON quality standard.

Insist on WELDON TOOLS FOR WELL DONE JOBS.

Write for Catalog 8-B.









Small shops as well as large ones find the Cross No. 73 the ideal answer to their gear burring and chamfering problems.

Operation is automatic. Set-ups can be completed within 15 minutes by inexperienced or unskilled operators. Average production is 200 gears per hour burred and chamfered at 80% efficiency. Quality is uniform, and cutter expense is so low that it is almost impossible to record.

In operation, the two economical fly cutters rotate at high speed in

synchronized relation with the work to chamfer and burr both ends of the gear teeth at the same time. The cutters are ground from ordinary tool bits. The work is clamped by foot-pedal control, so that the operator's hands are free to feed the machine. Automatic control stops the machine in loading position when each gear is finished.

These and other unique features of the Cross No. 73 are explained in a booklet which is yours for the asking. Just write The Cross Company, Detroit 7, Michigan.



Machine Tools

#### QUALITY

### and DEPENDABILIT







 Engineered quality and dependability of performance are the hallmarks of products of the Mid-West Abrasive Company.

Mid-West's outstandingly successful tool room grinding wheel, and every other product of the broad Mid-West line—honing stones, sharpening stones, coated abrasives, disks and wheel dressers—all must bear these two hallmarks.

Let quality and dependability guide you in your choice of abrasives, and we feel certain that choice will be Mid-West. Prompt delivery on all items.

MID-WEST ABRASIVE CO.

Manufacturers of DEPENDABLE Abrasives

Owosso, Mich.

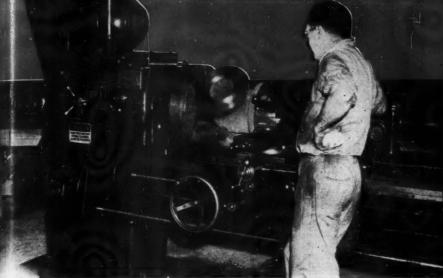
Detroit

Rochester, Pa.



108

# Here's the FIRST Hydratrol Lathe Ever Sold — *It's Still Going Strong!*



## O Years of Grueling Service for Lathe \*5155



5 SIZES-18" to 36"

	Small				18"	up	to	7 1/2"	Hole
	Mediu	in	١.		24"	up	to	12"	Hole
	large				27"	up	to	13"	Hole
	large				30"	up	to	14"	Hole
	large				36"	up	to	161/2"	Hole
								16" to	

THIS HYDRATROL LATHE was used by the original purchaser 9 years, most of that time 24 hours a day, 7 days a week. During this period the purchaser bought and used \$700,000.00 of HYDRATROL LATHES!

Having a surplus of this particular size, the owner sold Lathe #5155 in 1944, to the Corpus Christi Machine Shop, Corpus Christi, Texas, in whose shop the above photo was taken.

The new owner recently wrote us: "Hydratrol Lathe #5155 has given excellent service, and has never given any trouble. It is rugged enough to handle heavy work and still maintain the extreme accuracy originally built into the machine."

LEHMANN MACHINE CO., St. Louis 3, Mo.

HYDRATROL LATHES\*

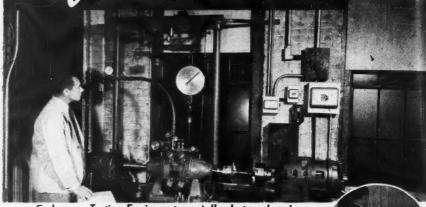
Mid-

West brabese

noice

ll be

# UNIVERSAL JOINT Life Insurance



Endurance Testing Equipment specially designed and arranged by Curtis cancels out rotor inertia until test speed is reached. The Hi-EFF Hydraulic Dynamometer and associated electrical instruments give exact endurance and efficiency data, operating from





The test shown acts as an "Insurance Policy" to users of Curtis Universal Joints . . .

We designed this special equipment to enable us to know exactly the life endurance and efficiency of Curtis joints operating at any angle.

Such complete laboratory tests INSURE YOU of having a product that meets, and in most cases surpasses, your requirements for strength, durability, smooth operation and low maintenance.

Curtis Universal Joints have proved the value of such careful checking in thousands of installations in planes of all types, machine tools and special applications.

Curtis Laboratory testing is most complete, and efficiently controls the QUALITY of every Universal Joint that carries our trademark.

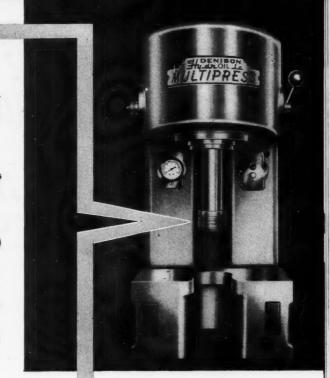
Write for technical data and useful Engineering Templates.

CURTIS UNIVERSAL JOINT CO. INC.
SPRINGFIELD, MASS. ... SOLE DISTRIBUTORS, BOSTON GEAR WORKS, NO. QUINCY, MASS.

Where can YOU use this amazing new VIBRATORY ram action?

(Oil-Hydraulic)

Ram action that permits short, rapidly-repeated uniform pressure strokes of regulative length, frequency, pressure and number per ram cycle



• So many startling advantages have been found in this new exactly-controlled vibratory ram action that, thus far, even we know only a few of its potential applications. Performance tests indicate that it may revolutionize scores of operations!

If your production includes any operation which you think might be improved by rapidly-repeated, uniform-pressure strokes, Denison engineers will be glad to adapt Vibratory HydrOILic Pressure to your specific needs! Write for information today!

This new vibratory hydraulic pressure principle is available in the equally amazing Denison Multipress—a four-ton and six-ton bench-size oil-hydraulic machine tool that performs almost any type of production operation calling for controlled pressure. Let us send you the latest, fully-illustrated bulletin on MULTIPRESS.

THE DENISON ENGINEERING CO.

1153 Dublin Road, Columbus 16, Ohio

THE DENISON



of

wor

ints

pnina

and

are-

all

ntly

rries



Now—it is possible to cut metal to lengths with phenomenal speed. The ONLY built-in, off-the-floor coolant model Band Saw that combines portability, convenient operation and which has a "dripless" enclosed band saw frame.

Triples production—lengthens life of saws—makes heaviest cuts on hardest metals at production speeds. The SAW of advanced design with EXCLUSIVE FEATURES.

Write for Bulletin or Ask Your Dealer.



Announcing



# DuBo

The Better

PLUG GAGE

DOUBLE END Sizes .240" to 1,510" (6mm. to 38mm.) SINGLE END Sizes 1.510" to 6.010" (38mm, to 152mm.)

Color Signals
GREEN = GO
= NOT GO

al d h

OΝ

chigan

treal

W

r, 1945

RELIEVED .

PATENTS PENDING

#### Newest Development in Simple, Precise Bore Gaging

Again STANDARD pioneers with DuBo, newest, most satisfactory bore checking gage of the fixed limit type. Gives to bore gaging new, effortless, finger-tip control, assures precision and speed far beyond the scope of ordinary plug gages . . . whether used by skilled or unskilled workers. Vivid color bands unmistakably identify go and not go members; unusual lightness and balance minimize fatigue and errors; simple manipulation makes DuBo ideal for use at bench or machine.

EASY TO USE • TELLS MORE

Spherical shape, chamfering and relef make entrance easy, gaging positive.

Color signals prevent confusion, fumbling, wasted motions, faulty readings.

Chamfer edge helps clean bore and prepares clean surface for accurate gaging.

Finger-tip feel and control reveal true internal conditions at any point in bore.

Reveals out - of - roundness, taper, belling, and dimensional deviations by tilt of handle.

May be used in deep bores and close to bottom of blind bores.

White!

Send NOW for illustrated, informative DuBo Bulletin.



STANDARD GAGE CO., Inc.
Poughkeepsie, N.Y.



Here is a striking example of high production grinding. These deep-groove ball bearing outer races with 1.8504 O.D. were ground on a No. 16 Automatic Blanchard Surface Grinder at the rate of 3100 per hour.

Courtesy SKF Industries, Inc.

The Economy Grinding Lubricant used on this job makes possible uniform surface structure and fine finish at a high production rate.

Economy Grinding Lubricants have been preferred for fast grinding, accurate form, and finest finish since the beginning of the wet grinding industry.

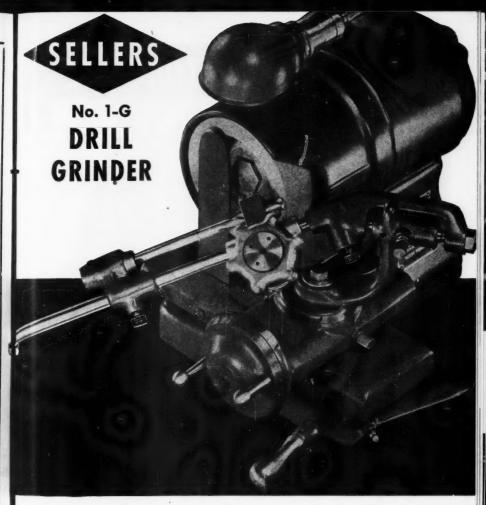
Have you a grinding job that requires volume production plus superior finishes?

Catalog G-16 gives all the facts. It's yours for the asking.

#### HEWHITE & BAGLEY COMPANY

WORCESTER, MASS, Detroit, Minneapolis

po



#### Every SELLERS Drill Point is Scientifically Correct

And it takes but a few hours for a green-horn to become an expert on this modern machine shop tool. Once set for the angle and clearance you require, it automatically produces a steady flow of perfectly pointed drills—each exactly like the

es.

st

n

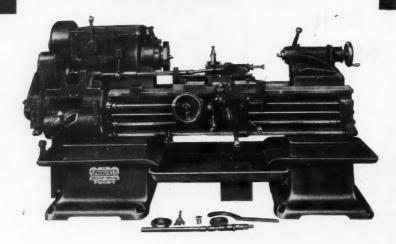
3.

1945

other. Speeds drilling time: reduces drilling costs: reclaims broken drills. Type 1-G takes drills from .028" (#70) up to ½" dia. Other models have capacities up to 3" dia. Write today for complete data and prices.

WM. SELLERS & COMPANY . 1614 Hamilton St., Philadelphia

## PRECISION and LONG LIFE



SPRINGFIELD Precision LATHES fill the munitions makers' demands for (1) extreme accuracy and (2) maintenance of this accuracy and long life.

Here are some of the factors that account for the sustaining of the original accuracy built into each Springfield Lathe:

HEADSTOCK...12 speeds...only half of the easy-shifting spur gears mesh at one time. APRON...extra heavy... operates on ball and bronze bearings throughout. TAIL-STOCK...all bearings and bed ways oiled from one well.

The SPRINGFIELD LATHE is an outstanding value for both tool room and quantity production use. Write for Bulletin 162.

## THE SPRINGFIELD MACHINE TOOL CO.



#### SAVE THESE FOR WORK A MACHINE CAN'T DO



HC-5-1/2 H.P., multispeed countershaft unit, 900 to 3600 R.P.M. Mounted benchheight on 3-leg caster base, 360° swive

rinding—Sanding—Rotary filing—Wire brushing— Buffing and Polishing—all are machine operations. There are many more.

All can be done better and faster, with a greater degree of efficiency, by using a Haskins Flexible Shaft Machine. And this with much less strain and fatigue on the part of the operator.

Write for Catalog 45, showing many ways to speed production with flexible shaft equipment. And remember—save your hands for work a machine can't do.

R. G. HASKINS CO.

619 South California Ave., Chicago 12

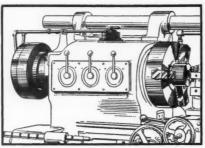
FLEXIBLE SHAFT

MODERN MACHINE SHOP

1945

# OWER MUCKS SKINNER

# ot FAST CHUCKING





Double acting rotating air cylinder for fast operation of power chucks and special headstock 1300



Self-Centering power chuck with three non-adjusting jaws and forged steel body.

Modern production calls for fast accurate machining, plus the elimination of as much idle time as possible. That's where Skinner Power Chucks can help you.

On turret and engine lathes and automatic machines where long runs and repetitive operations are performed, the chucking time may be an appreciable part of the total operation time. Skinner Power Chucks are designed to grip fast, hold tight, and release fast - all by means of a single operating lever. This means a minimum of chucking time and a minimum of operator fatigue.

Skinner power chucking equipment includes a complete line of self-centering, non-adjustable and combination adjustable chucks, air cylinders, operating valves, gauges, filters, etc. - all are designed for long life and trouble-free service. Write for Catalog No. 57 which gives complete details and specifications on all Skinner products.

THE SKINNER CHUCK COMPANY



340 CHURCH ST., NEW BRITAIN, CONN.



HAND & POWER OPERATED MACHINE CHUCKS-AIR CHUCK EQUIPMENT-FACE PLATE JAWS

118

# RENBY HYDRAULIC

#### **FEATURES**

- · Infinitely Variable Longitudinal Traverse
- Hydraulic Cross Feed
- Coolant

IN.

1585

945

- Precision Spindles
- Heads Swivel For Angle Work
- **Grinding Heads To Convert** For Internal Grinding (See Cut)

#### **EG103 SPECIFICATIONS**

Work Capacity—3" Dia. x 10" Length Workhead Accommodates—Collets 1" Max. Hole -Chucks & Face Plates 4" Max. oor Space & Wt. 45" Long x 25 Wide-1600 lbs.

THE GRENBY MANUFACTURING COMPANY



# They've Got What It Takes For Long Punishing Service



Designed for greater efficiency, lighter weight, increased power, and improved handling

#### A Size for Every Need

Heavy Duty  $1'' - \frac{3}{4}'' - \frac{5}{8}'' - \frac{1}{2}''$  (2)  $-\frac{3}{8}''$  (2)  $-\frac{5}{16}'' - \frac{1}{4}''$  Special  $\frac{1}{4}''$  All Angle

Ask Your SIOUX Distributor or Write for Details

# SIOUX

STANDARD THE



WORLD OVER

SIGHT CITY LOWA-M

# Machine Shop

SEPTEMBER, 1945

VOLUME 18

NUMBER 4



HOWARD CAMPBELL, Editor

Published monthly by GARDNER PUBLICATIONS, INC. 431 Main St., Cincinnati 2, Ohio

DON G. GARDNER
President and General Manager

JOHN M. KRINGS Advertising Manager

G. M. FILLMORE 342 Madison Äve. New York 17 Murray Hill 6-3899

GEORGE H. MEYERS
Tribune Tower, Chicago 11
Superior 2290

CHARLES H. DEILY, JR. 310 West Durham St. Philadelphia 19 Chestnut Hill 1198

RALPH M. FRENCH 627 Union Commerce Bldg. Cleveland 14, Ohio Main 2866

Member



Printed in U. S. A.

Copyright 1945 by Gardner Publications, Inc

#### CONTENTS

Making Steel Cartridge Cases for the Navy
Chip and Oil Salvage Is Profitable140  By H. O. Stock
Small Drills Are Important Tools!
Electronic Sound Gaging Device Developed by Timken180
Stretch Forming of Aluminum
News of the Industry216
Ideas from Readers
by L. Kasper234
New Shop Equipment240
Services Directory
"Where to Get It"
Cartoon
Over the Editor's Desk
Index to Advertisements

45

# RMSTRO



ARMSTRONG HIGH SPEED

ARMALOY

ARMIDE

Correct ARMSTRONG TOOL HOLDERS and correct Cutter Bits for every machining speed and every machinable material

The Armstrong System of Tool Holders provides correctly designed ARMSTRONG TOOL HOLDERS for every operation of lathes, planers, slotters and shapers and for many turret lathes and screw machine operations. It also provides proper types of cutters, bits and blades for every cutting-speed and materials.



**Armstrong Tool Holders** 

- · For general tool room and machine shop use ARMSTRONG HIGH SPEED Bits and Blades are unsurpassed. They will stand up to speeds and feeds far greater than those generally accepted as "standard."
- ARMALOY Bits and their corresponding ARMSTRONG CA TOOL HOLDERS are recommended for machining sand-filled castings, malleable iron, nonferrous metals, rubber, plastics and for machining steel on modern high production machines, where sufficient speed and feed can be obtained to take advantage of their greater cutting capacity.
- · ARMIDE Carbide-Tipped Cutters and ARMSTRONG Carbide Tool Holders, make the use of Carbide-tipped tools practical in even the smallest shop. Coming in two grades ARMIDE Red (for steel) and ARMIDE Gray (for cast iron, brass, aluminum and non-ferrous materials). They easily machine hard and tough steels, and stand up to the highest speeds and heaviest feeds. and increase the interval between tool re-grindings as much as 10 to 50 times.



**Armstrong CA Tool Helder** for Armaloy Cutters



Armstrong Carbide Tool Holders for Armide Cutters

#### ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

315 N. FRANCISCO AVENUE

CHICAGO 12, U. S. A.

Eastern Whse, and Sales: 199 Lafayette St., New York 12, N. Y. Pacific Coast Whse, and Sales Office: 1275 Mission St., San Francisco 3, Calif.

RMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

# Machine Shop

SEPTEMBER, 1945

Vol. 18, No. 4

CINCINNATI, OHIO

#### This Month's Features

The war with Japan is over, but the search for up-to-the-minute information on metal-working developments will never cease. The lead article this month presents some interesting and valuable information on the drawing and processing of steel cartridge cases. This article is the best on the subject that we have seen. Page 124.

An article that will be of interest to manufacturers who are faced with a problem regarding disposal or reclamation of chips and shavings is found on page 140. The material is presented by courtesy of John Inglis, Limited, of Toronto.

We all thought that we knew how to grind drills, but K. H. Luther, of the Murray Corporation of America, shows us—in an article that begins on page 160—a new and highly valuable kink in the grinding of small drills. And because we saw it done, we can certify that Mr. Luther knows what he is talking about.

We are all grateful—beyond words—to the men who faced the enemy in battle that America might live on in freedom, and every employer is wondering what he can do for the boys who come back disabled. Such employers will be interested in the short article that begins on page 180.

The technique of stretch forming is comparatively new to many manufacturers, so we sent Gil Close, out in California, to get a good story on this process from the Douglas Aircraft plant. Page 190.

Manufacturers who are looking for something to make will be interested in the "News of the Industry," beginning on page 216, and the "Ideas from Readers" fans will find their department on page 228. We hope you like 'em.

945



40 MM Cartridge Case Press Department in Clayton & Lambert-Armco Plant at Ashland, Kentucky

## Making Steel Cartridge Cases For The Navy

First tried as a substitute for brass for cartridge case material, steel has proved to be practical and advantageous.

> By WILLIAM E. McFEE American Rolling Mill Company

W HEN a battery of U. S. Navy 40-mm Bofors-type anti-aircraft guns goes to work on a squadron of Jap warplanes, the enemy is in for a hot time. Invented by the Swedes and

improved by Naval Ordnance experts, this powerful, rapid-fire gun is unquestionably the punchiest medium-range AA gun of the war.

The Navy 40-mm gun is mounted

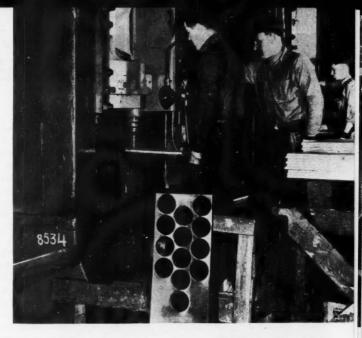
Cartridge Case Manufacture Begins with the Operation Shown Here, in which Three Blanks are Cut, at One Stroke of the Press, from Half-Inch Thick Steel Slabs

on all combat vessels of the United States Navy, from the lithe and speedy PT boats to the heaviest battlewagons. The gun is power-operated and is mounted in batteries of two or four. Fire control can be either local or indirect. In action,

it has often been fired at the rate of 160 rounds a minute, although its normal pace is 120. The ammunition is fed to the guns in clips of four car-

tridges which the gun crews handle quickly and smoothly with never a lost motion. When several batteries of these guns are in action, they fill the air with 40-mm projectiles that are fired instantly by an impact fuse when they strike.

In the Second Operation the Blanks are Formed into Cups



Like other cartridges, the three most essential parts of the 40-mm are the cartridge case, the propellent (powder charge), and the projectile.

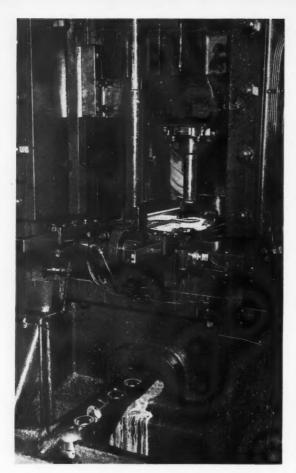


ucky

У

exn is

ted 1945



Rear of Press in which the Blanks are Cupped, Showing Blanks Rolling Down onto the Conveyor that Carries Them to the Next Operation



aircraft gunners have no time to fool with defective ammunition when the sky is dark with enemy bombers and fighters.

When the United States was attacked by Japan we were caught short of some vital materials, among which were copper and zinc-the chief elements of brass. Cartridge cases, both large and small, had been made of brass for many years and had given such a good account of itself on this job that no thought had been given to the possibility of using any other material. But with a shortage of brass imminent, the use of some other material was imperative.

Steel came in for consideration, of course, and the Naval Ordnance men went into the problem thoroughly with the steel producer and the cartridge case manufacturer. Out of the

combined effort of Chas. F. Lambert, president of the Clayton and Lambert Manufacturing Company. Calvin M. Verity, President of the American Rolling Mill Company, and the Naval Ordnance Engineers came a steel case that met every Navy requirement, at a cost that compared with brass. The secret lay in using just the right steel, with carefully-controlled manufacturing and heat treating.

The manufacturing program was started in the Clayton and Lambert plant, but it soon became evident

And of these the case is by no means the least important.

The cartridge case is a slender metal container about 12-1/2 inches long by 2-3/8 inches in diameter at the head end, tapering gradually for about three-fourths of its length and with a more pronounced taper for the rest of its length. In the center of the head a 9/16-inch hole is drilled and reamed for the primer. The case must be a snug fit in the gun chamber, but it must slide into the barrel easily so that it can come out fast. Naval anti-

The Cups are Inspected as They Pass in to the Automatic Washing Machine

a the

wing

o the

e no

efec-

the

.

emy i

ates

1 we

ome

ong

and

ents

ases.

had

for

iven

f it-

no

n to

any th a

ımither

ive. sid-

the

rent

igh-

icer

ease

the

ert.

pert

 $\mathbf{M}$ .

can

val

ase

, at

The

eel.

ur-

vas

ert

ent

1945

that an additional plant would be needed. Accordingly, Armco cleared out of some of their buildings at Ashland, Kentucky, and the Clayton and Lambert men moved in. Before long steel cartridge cases were flowing along conveyor lines and out to the European and Pacific battle fronts.

No ordinary steel can be used for cartridge cases; the steel has to be carefully compounded and carefully

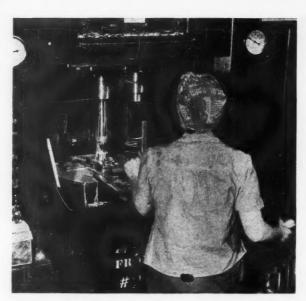
made. It is high in carbon for deep drawing steel, which tends to make it difficult to form, but notwithstanding this characteristic the steel developed by Armco metallurgists is hard, tough, ductile and comparatively easy to draw.

Cartridge case manufacture starts with heavy plates, slightly over half an inch thick, with surfaces that must be almost as good as the finished sheets had to be when the plates were rolled into light gauge sheets—free from seams, roll marks, pits and scratches. The plates are sheared for easier handling, pickled in a hot acid solution to remove the oxide from the surface, and then annealed to remove



the strains that invariably are set up in the rolling operations.

The first machining operation in the making of a cartridge case is the blanking operation, which is performed in a huge power press. Three blanks are cut at a time from the half-inch plate, two men feeding the plate in at one side of the press and two others handling the blanks on the other side. The discs, 4-1/2 inches in diameter and weighing slightly more than two pounds, roll out of the press and onto a conveyor which carries them through an alkaline wash to remove the blanking oil. Following the wash, the blanks are pickled in an acid solution and then rinsed and



In the Second Drawing Operation the Cups are Drawn Longer and Thinner The

has

the and Th

dr

ea

ing

cha

mu

firs

ou

COL

rid

ral

pa

sec

sul

hea

wh

pre

the

int

a ]

hea

1,0

pre

fee

are

tin

an

ca

At

wh

tri

chi ma cui fee doi mo

ati hy

Sep

the cups are fed into an annealing furnace where they remain 50 minutes at a temperature of 1310 degrees F. At the end of this period they start moving through a water-cooled hood in which the temperature is gradually reduced. The total time here is 2½ hours.

The annealing operation has released the strains in the metal and

softened it to a point at which it can be drawn without too much difficulty. In the first drawing operation the cups are placed in a dial feed mechanism on the press table and are thus fed to the press in quick succession. As they leave this operation,

dipped in flux before being coated with lead alloy. The film of lead is applied to the steel to act as a lubricant in the drawing operations.

The next operation is called "cupping." The neatly-stacked blanks feed in to a location over the die, then

the punch draws each blank to the shape of a cup. As the press-ram rises, the cup rolls out of the die and onto a conveyor. The operation is rapid; thus the stream of parts onto the conveyor is continuous. The conveyor carries them through a wash, then through a hot air-blast which dries them. This is followed by a rigid inspection, after which



As the Cases Leave the Intermediate Drawing Operation They Feed Down onto the Conveyor Belt at the Rear of the Machine

The Final Draw. Each Case has become a Long Tube, Closed at one End

Op.

IWI

nto

ace

50

ra-

F.

pe-

ing

led

m-

lly

me

ra-

the

nd

an

ty.

he

la-

re

ic-

on.



they are a little longer and a little thinner. There are five of these drawing operations, each of the presses being equipped with a mechanical stripper.

The second draw is much the same as the first, drawing the case out longer and, of course, thinner.

The head of a cartridge case must naturally be the thickest part, so following the second draw the case is subjected to the "preheading" operation in which metal is compressed at the base of the case to be formed into a complete head in a later operation. Preheading is done in a 1,000-ton mechanical press equipped with dial

feed and mechanical knock-out. There are five of these presses.

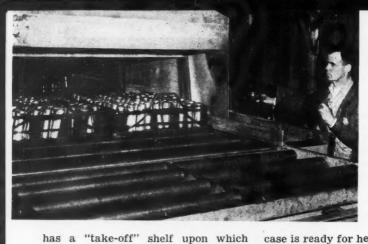
After another cleaning in a continuous washer, the cases are again annealed, lead-alloy-coated for lubrication, and drawn for the third time. At this point the open end of the case, which has become quite irregular, is trimmed off in a small trimming machine equipped with hopper feed. The machine is automatic, with a rotary cutter. As the case automatically feeds into position, the cutter moves down and cuts off the end in a single movement.

There are four more drawing operations, all of which are performed in hydraulic presses. It is the contention



of the engineers who set up this job that hydraulics operate with a smoother, more uniform stroke than mechanically-operated presses. The fourth and fifth drawing operations are done in 75-ton presses equipped with hand-shuttle feed and mechanical strippers. A wax-soap dip helps to lubricate the cases through the sixth draw, and then the cases are again trimmed, washed and annealed and again wax-soap dipped for the seventh and last draw.

The cases move from press to press on a moving conveyor belt which moves slowly enough so that no cases get by without being processed. At the seventh draw the girl operator



she accumulates a reserve supply, to

ensure a constant supply of materials.

As the cases move toward her on the

belt, she holds the handle of the guide

with her left hand, picks each case

off the belt with her right and places

it in the holder. She pushes the safe-

ty handle forward to set the case in

the correct position, then presses the

A Batch of Cases Entering One of the Annealing Furnaces for Stress Relieving



top button on the panel at her right and the press completes the drawing of the case.

Another trim and a wash, and

u

1

c

t

c

i

r

t

r

a

0

it

I

9

f

t

a

p

C

h

f

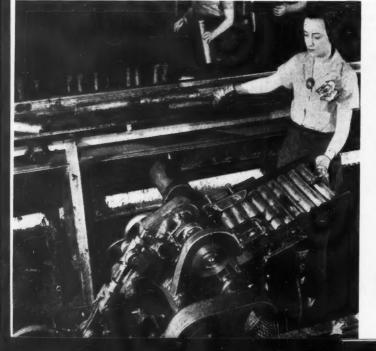
t

in th

case is ready for heading. As the case comes from the seventh draw the head is uneven and lacks the necessary flatness. To remedy this defect the cases are moved to a press equipped with seven fixtures on a rotary table, each fixture being so designed that a case will fit into it vertically, supported by a pin that fits the inside of the case. The pin

serves as an anvil; when the punch descends it produces on the case a smooth, flat head.

Up to this point, the drawing operations have developed a case that is straight between the ends. Now it becomes necessary to taper the wall of the case under the head so that it can be





Placed in the Hopper, the Cases Feed into the Machine where the Ends are Cut off. The Machine is Automatic. The "Restriking" Operation, in which the Heads are Flattened and Formed

En-

An-

the ght

the

the

im

and

ase

the

es-

ect

ess

a

de-

it

hat

pin

an-

he

s it

the

oth,

nis

W-

ons

1 a

is

een

r it

es-

the

ase

ead

be

op-

ne

are

ine

casily inserted into and ejected from the gun in which it is to be used. The tapering operation is performed in a 150-ton mechanical press, using a tapering die. The case is dropped into the die, the ram descends and the punch pushes

the case down into the graduially narrowing hole in the die, then, as the ram ascends again, a mechanical knock-out pushes the case back up so that it can be removed by the operator. In the tapering operation the cases grow longer by half an inch.

The tapering operation is followed by a rigid inspection, then the cases are washed again in a continuous washer.

The next operation is performed in an automatic chucking machine. Here the head and rim of the case are faced and turned, a circular groove is cut into the base of the head, another groove is cut in the sidewall for the gun

extractor mechanism, and the primer hole is drilled and counterbored. All of this requires five spindles of the six-spindle machine, the sixth being the loading station. As fast as the machine operator removes the fin-





The Cases are Washed Between Operations to Remove all Grease and Oil





A Chucking Machine is Used to Face and Turn the Head, Drill and Counterbore the Primer Hole, and Cut Grooves for the Extractor Mechanism

degrees F. by the use of five refrigerating machines, each of 40 tons capacity. This heat treatment takes about 20 minutes, and is so vital to the successful processing of the steel cases that hourly checks are taken on the brine, temperature and content, concentration, gas atmosphere, and heat zone temperature recorders.

Salt water is not good for steel, so the cases are put through a cold water wash in which the brine is

removed. The glass-hard cases are then temper-annealed in two continuous gas-fired furnaces to remove the brittleness. However, it is necessary that the mouth of the case be soft so that the projectile can be inserted, so the mouth end of each case is passed through a "ribbon-flame" fur-

ished pieces from the machine and places them in the conveyor basket, they are inspected by the inspector at her right.

After another washing and hot air drying, the cases are put through another heat treating operation in which they are heated to 1650 deg.

F. and then dumped into a 10 per cent brine quench. The temperature of the brine is maintained at 65 to 70



In this Furnace the Cases are Heated to 1650 Degrees, then Quenched in Brine to Give Them the Necessary Temper



Sept

T-6

is i

sma

pari

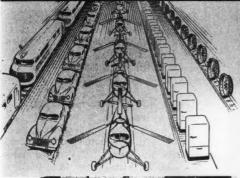
usec

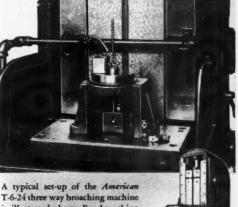
is h

bros

accu







A typical set-up of the American T-6-24 three way broaching machine is illustrated above. For broaching small serrated holes in carburetor parts a small bridge type fixture is used. A block on top of the bridge locates the part, while the broach is held in location by a pin type broach puller. Production is fast and accurate with fine finish.



ed id,

Cut

of naonseat out so

ful

eel

cks

ne,

on-

gas

eat

re-

ood

ses

1 a

in

is

are

tin-

the

ary

t so

e is

fur-

Avoid excess load on broaching tools. Do not attempt to broach parts that are improperly prepared. E A S I E R with Broaching by

American

Standard equipment, capable of performing a wide variety of different tasks, can naturally eliminate many of reconversion's headaches. Standard American broaching machines, designed with this basic fact in mind, are made for maximum flexibility. That is why manufacturers in many industries turn to broaching by American to perform their metal finishing jobs.

American offers a complete broaching service—machines, tools, and engineering. American engineers will gladly recommend the correct standard equipment for your job, or, if necessary, design special machinery to meet your requirements. For further details, write American today. There is no obligation.



ANN ARBOR, MICHIGAN
BROACHING MACHINES

PRESSES
BROACHING TOOLS
SPECIAL MACHINERY





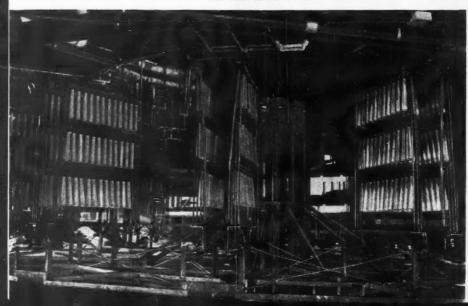
The Primer Hole is Reamed to Size in this Press, which is One of 18 Machines on this Operation

is removed by acid pickling. This is followed by rinsing and neutralizing, and the cases are ready for the third taper dies. The third tapering operation sizes the case and gives it the shape that is seen in the finished case.

The primer hole is now sized and finished by reaming, which is done in a drill press. Eighteen drill presses equipped with power feed are required for this operation. The case now moves to an automatic hand-fed rotary trimmer, where the case is trimmed to length and the head is marked for identification. At this point the case is given a thorough inspection, including gaging of every dimension and a critical examination for possible defects. Cases that sur-

nace which anneals the metal at this point. The air cooling process that follows produces a slight scale, which

The Cases are Zinc Plated for Corrosion Resistance. These Plating Machines are the Largest of their Kind in the World



"In hou mo

rec Fou indi fine

Rac plan ope the skill

Writ

Sepi



d d d n s d w o- is is

is 1-

y

n r-

of

"In constant operation twenty-four hours a day for one year and three months without one cent for repair or maintenance." This performance record at The Pittsburgh Steel Foundry, Glassport, Pennsylvania, indicates the correct design and fine workmanship found in Cincinnati Bickford SUPER SERVICE Radial Drills. Moreover, at this plant, due to the simplicity of operation and ease of control of the SUPER SERVICE Radial, no skilled operators were required.

Write for detailed Bulletin R-24A

See our condensed catalog in Sweet's File

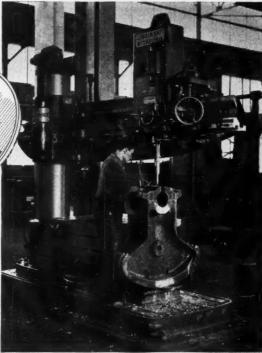
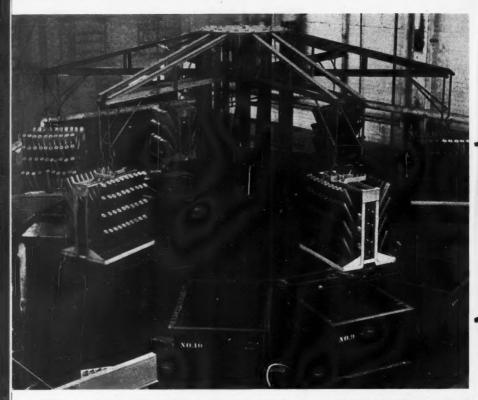


Photo: Courtesy of Pittsburgh Steel Foundry, Glassport, Pa.





THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9. Ohio U.S.A.



Dichromate Dipping. The Dichromate Combines with the Zinc to make the Cases Corrosion-Proof

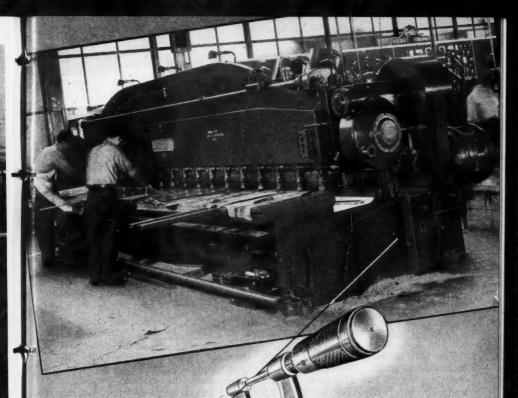
vive this ordeal—and most of them do—are ready for zinc plating. Steel is a wonderful material; strong, tough, and versatile, but it must be protected against corrosive elements.

The zinc plating units are especially designed for this job, and are the largest pieces of equipment of their kind in the world. There are 14 stations on each machine. The first is the loading station, next is the anodic cleaning, then rinsing, a mild acid pickle to obtain a chemically-clean surface, another rinse, a final anodic cleaning, and a final rinse.

Four stations are required for the zinc plating process, then two cold

water rinses and a hot rinse to complete the process. The powerful mechanism gently lifts a rack of cases from a vat, carries it to the next, lowers it into the solution—and so on around the circle. The timing is all automatic. The cases leave the machine lightly plated inside and out, and with a silvery gray color.

An "enemy" to metal—hydrogen—has been picked up in this process, and if it weren't removed the cases would tend to be brittle. So the next step is dehydrogenizing in a continuous furnace. It takes an hour and forty minutes to drive off the hydrogen, after which the cases are ready



## Shear to THOUSANDTHS OF AN INCH...

The square blank—the accurate blank—is the profitable blank. The rapid, accurate performance of Cincinnati Shears saves many an hour in the forming and punching operations, and many an hour in the general assembly and fabrication that follow.

Cincinnati Shears pay double dividends in time saved in shearing and in time saved in fabrication.

· Write for Shear Catalog No. S-3.

THE CINCINNATI SHAPER CO.

of

se

r-

of

ne

nd is

he

ıt.

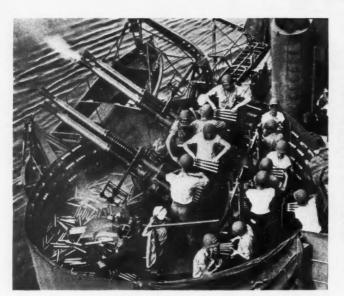
es

xt u-

nd

ody 245 CINCINNATI OHIO U.S.A. SHAPERS · SHEARS · BRAKES





Battery of 40 MM Bofors-Type Anti - Air-craft Guns in Action on an Airplane Carrier

for the final operation.

The last operation is a dip into a dichromate bath. Dichromate is a chemical which has a remarkable affinity for zinc. Together, bonded with each other as they are in this dipping operation, they make the cartridge cases practically immune to corrosion. The dichromating equipment is similar in design to the zinc plating machine, with the exception that it is

smaller. There are twelve stations in the unit. and the whole process is automatic except for loading and unloading. As they come from this machine they are placed in a drying oven from which they emerge thoroughly dried.

One more inspection. inside

and out, with gages and instruments, and the cases are ready to be packed and shipped to the naval inspectors. If they pass the critical inspection of these gentlemen-and they usually do -they are sent to loading plants to receive the primer, powder charge, and projectile, and are then shipped to the point of use.

(Photos Courtesy Armco; Frank Elam, Photographer)

"The Art of Generating with a Reciprocating Tool" is the title of a 48-page 81/2x11-inch booklet published by The Fellows Gear Shaper Co., 78 River St., Springfield, Vt. By no means confined to the design and production of gears, the booklet discusses the application of a reciprocating tool to the production of shapes and parts.

In the forefront of the booklet, the author has analyzed the principle of generation and pointed out the applications of this principle with the aid of simple and illuminating illustrations. Included are a total of 138 illustrations. the majority of which are diagrams and examples of practical applications. Among these are a wide variety of in-

ternal and external surfaces that can be machined to extremely close tolerances.

Copy of the booklet is available free to mechanical executives addressing requests on their company letterheads.

"Gaging with Air" is the title of a 12-page circular released by Pratt & Whitney, Division, Niles-Bement-Pond Co., West Hartford, Conn., containing complete up-to-date information on the various models of Pratt & Whitney Air-O-Limit Gages. Copy of Circular No. 479 free upon request.

CLEAN CUTS AT
HIGH SURFACE SPEEDS



#### SUNICUT...

y seen

le s,

If of

lo

e.

n

&

nd

r-

#### Improves Turning, Boring, and Threading Operations On Brass

The right cutting oil for the right operation can make the difference between rejects or parts which meet the most exacting requirements. This was amply proved by a manufacturer of precision parts when he switched from a competitive oil to Sunicut No. 973 for turning, boring, and threading on the following operation:

Type of Machine: National Acme Gridley Automatic Screw Machine; 2½" capacity; Model R.B. Six Spindles.

Material Machined: Commercial Rod

Operation: Machining Booster Body for Fuse

Speed: 400 Surface-Feet per Minute Feed: .003"

Lubricant: Sunicut No. 973

With the competitive oil, it was difficult to maintain accuracy of finished parts. Threads were of poor quality, due to chatter-marks. Rejects ran high.

When a Sun Oil Company Engineer was called in, he recommended a change to Sunicut No. 973. Production increased. Accuracy was held to closer tolerances. Chatter-marks were eliminated. Better threads were obtained. Rejects were greatly reduced.

For factual proof of what Sunicut, the clear, transparent, non-emulsifiable cutting oil can do for you, test it in your own plant. Write . . .

SUN OIL COMPANY • Philadelphia 3, Pa.
Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

OILS FOR AMERICAN INDUSTRY

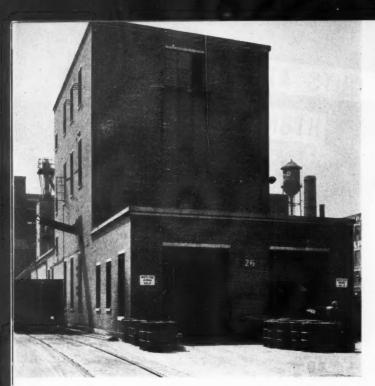


Fig. 1—Three-Story Building Designed Especially for Reclamation of Oils and Solvents from Chips and Turnings

By H. O. STOCK

### Chip and Oil Salvage Is Profitable

A centralized chip and oil reclaiming plant has paid for itself in approximately two years of operation at the plant of John Inglis Company Limited, Toronto

SINCE the beginning of World War II the huge plant and resources of the John Inglis Company Limited, Toronto, Canada, have been devoted to the production of war materials and equipment, including the manufacture of Bren and other types of guns. The necessity for expansion of productive capacity has forced the construction of additional buildings and the installation of additional equipment. To the other difficulties incidental to the rapid expansion of plant and the production of an en-

tire the cut oil.

by of ere builtings

beir

ame oth gat and stee aluman

chi coo

kep tho oil. T this the of a la con typ

Fig

vide

Fig. Chip along vevo Enter Eleveries tirely new line of products was added the problem of handling the chips and cuttings and the disposal of the used oil.

A thorough study of the problem was made by the plant engineers. The desire to overcome handling difficulties and at the same time to avoid waste by reclaiming as much as possible of the chips and oil led finally to the erection of a modern three-story building equipped with hoists, centrifugal extractors, settling tanks, and filters, the gravity flow principle being utilized for chip and oil salvage.

#### Chip Segregation at the Source

In order to obtain the maximum amount of profit from the sale of metal cuttings it is necessary, among other things, for chips to be segregated according to the various types and kinds of metal, such as alloy steels, carbon steel, copper, brass, aluminum, and so on. To obtain the

maximum gain from oil recovery, chips bearing coolant must be kept apart from those containing oil.

To facilitate this separation of the various kinds of metal scrap, a large number of containers of the type shown in Fig. 2 are provided. Such cans

have been painted with identifying colors and labels to clearly show the kind of material to be placed in each. The receptacles are oil-tight and are of rugged construction to prevent the early development of leaks.

For each metal-cutting operation a chip can, properly marked, is provided, and for each row of machines a suitable bank of empty containers is maintained next to the main aisle. Whenever a receptacle at a cutting operation becomes full, it is easily moved to the aisle and exchanged for an empty can similarly marked.

#### Delivery and Pick-Up of Cans

A trailer train, operated by a maintenance department employee, makes regular trips along the main aisles of the plant, gathering the full cans and leaving in exchange an equal number of suitably-marked empties. When the trailer train has been loaded to

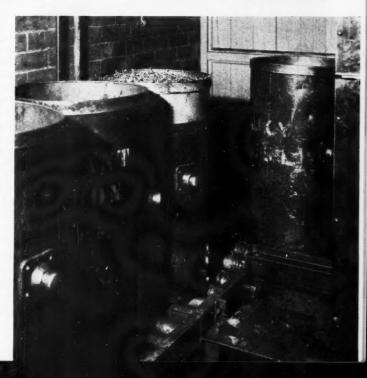


Fig. 2—The Loaded Chip Cans Move along a Roller Convevor, then Turn and Enter an Automatic Elevator which Carries Them to the Third Floor

S

al

T

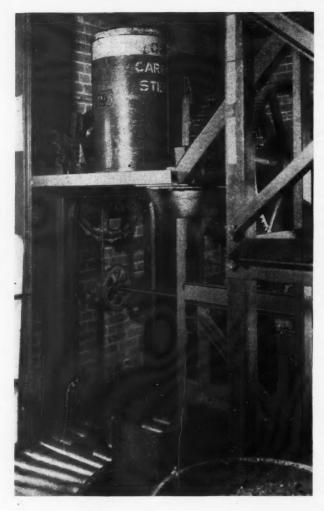


Fig. 3—Loaded Chip Can on Third Floor Level, about to be Deposited on Mezzanine Roller Conveyor

by an automatic hoist and delivered to the top floor of the building.

The third floor has a mezzanine which is equipped with a roller conveyor to receive the full cans that are brought up by the elevator. An operator moves each container along on the rollers to a point directly above the correct bin for the class of cuttings to be emptied, at which point a tilting mechanism is utilized to upset the can. Thus with a minimum of effort the metal scrap is dumped into one of the large hoppers, as illustrated in Fig. 4.

As each chip can is emptied, it is returned to the ground floor by a can-lowering conveyor and auto-

matically deposited on a roller conveyor extending along the north side of the building, upon which the cans move to the reloading point. From here the empty cans are loaded back into the plant to be exchanged for full cans, and thus the routine continues.

Storage hoppers that have been filled with chips containing coolant

capacity, the driver heads for the chip house. Upon arrival he drives his load into the building to a convenient location on the south side of the receiving room, where his cargo is transferred to a roller conveyor. The full containers slowly move along this conveyor to the end, as shown in Fig. 2, where they make a right angle turn and are then picked up



Fitting tool-steel female punch die with 10-inch Nicholson Round Smooth Cut File.

RECONVERSION means busy days, for the diemakers. And precision is one of the first rules in their highly specialized work.

Nicholson's study and manufacture of files for diemaking covers many years. We know the accuracy demanded — the cuts, shapes and uniformity required.

For finishing dies with liberal tolerances, many Smooth and Second Cut Nicholson regular purpose files are suitable. For close tolerances and intricate shapes, the slenderer, more pointed and finer cut regular types of Nicholson X.F. Swiss Pattern Files are available; for small dies or extra-fine detail, Die Sinkers Files and Rifflers and Needle Files comprise a wide assortment of shapes and sizes in the famous Nicholson X.F. Swiss Pattern line.

Ask your mill-supply house for currently or presently available types, shapes, sizes, sets.

FREE BOOKLET, "FILE FILOSOPHY"

NICHOLSON FILE CO., 48 Acorn St., PROVIDENCE 1, RHODE ISLAND (In Canada, Port Hope, Ont.)

# NICHOLSON FILES WHOLSON

e red litres gaerst

g

1-

n.

:-

1e

 $\mathbf{of}$ 

as

4.

is

ed

or

ıg

n-

de

ns

m ek ill

es.

nt

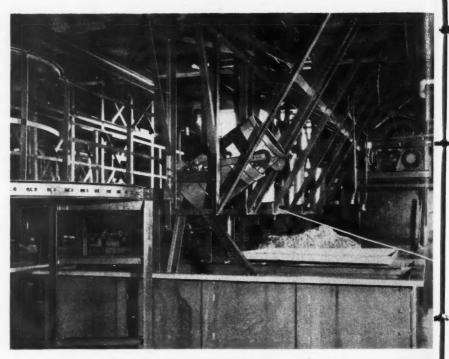


Fig. 4—Manipulated by a Dumping Fixture that is Operated by a Foot Pedal, Chip Cans are Emptied Rapidly and with Little Effort

are allowed to drain for at least eight hours, and since the coolant is of little value it is allowed to wash down the drain and into the sewer. The comparatively dry chips are then discharged through a gate in the storage bin and into a chute that extends out through the wall. The chips move down this chute by gravity and drop into a waiting railway car as illustrated in Fig. 6.

Loading is started at one end and the railway car is moved along the siding, a few feet at a time, by an electrically-controlled car spotter that is controlled from the second floor of the chip house. Thus the loading is accomplished with a minimum of manual labor in the handling of the turnings. Each car is loaded

with only one class of scrap; alloy steel for one car, carbon steel for another, and so on.

After being allowed to stand for a period in the drainage bins, the chips that contain cutting oil are further processed through centrifugal extractors of the type shown in Fig. 7. The extractors remove the additional oils that is still clinging to the cuttings and which otherwise would be lost. To handle these chips each bin is equipped with a gate, conveniently located and accessible from the second floor, so that chips may be discharged directly into an extractor basket. A monorail hoist is then used to lift the loaded basket into a centrifugal extractor where the oil is quickly removed. The



# HARDINGE STANDARD CIRCULAR CUT-OFF TOOLS

for Brown & Sharpe machines

HARDINGE Precision Ground Circular Cut-Off Tools are available for No. 00. No. 0 and No. 2 Brown & Sharpe Automatic Screw Machines.

These Cut OB-Tools have blade thicknesses in reliation to the stock diameters which can be cut-of on the above machines. With our literature, you can design your form tools with a breakdown section to much the standard Cut-OH blade width.

The distance from the holder side of the Cut-Off Tool to the Cut-Off blade is held to a close tolerance therefore these Cut-Off Tools can be changed without readjusting other tools in the set-up.

HARDINGE Circular Cut Off Tools reduce tool inventories and set-up time—increase production.

Write for literature giving complete dimensions and prices

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

September, 1945

s are

alloy

r an-

for a chips

The d oils tings t. To

pped l and r, so ectly orail

aded

The

MODERN MACHINE SHOP



Fig. 5—The empty
Chip Cans are Returned by the Descending Elevator
and automatically
Deposited on a Roller
Conveyor at the North
Side of the Chip
House Receiving

if possible, or in any case within the four day period. So that each car need be held for a minimum length of time, one or more bins should be full of chips before a request is placed with the railway company for an empty car to

be placed on the siding.

#### Reclaiming Cutting Oil from Chips

Cutting oil that is drained from chips while standing in the bins, together with the extra oil removed by the centrifugal extractors, is carried

basket of dry chips is then lifted out by the monorail hoist and carried to a chute into which the contents are dumped to slide down to a waiting railway car.

From the time a car is placed on the siding the railway company al-

lows 48 hours free time for loading. Demurrage for the next two days amounts to two dollars, and for the fifth and succeeding days, five dollars each day. Thus, for economical operation, each railway car should be filled within two days

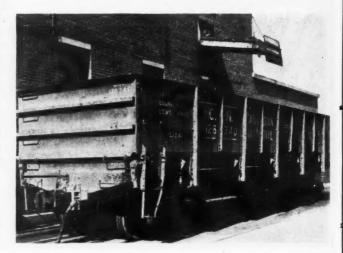


Fig. 6—Railway Car in Position to Receive Steel Cuttings from the Gravity Discharge Chute

Sept

"American GREEN CARBOLITE (GC) For cemented carbides, "American" Carbolite wheels cut smoother, faster, cooler. For heavy cuts, rapid stock removal, use "American" No. 15 structure

extremely open and porous, very cool cutting; No. 8 structure for precision grinding where wheel face shape must be maintained. Types: plate mounted straight sided—cup, dish and cylinder. Write for information.

WORKS WHEEL

2 RICHMOND SQUARE, PROVIDENCE 1, R. I.

r

e. of ey 0

0y ed

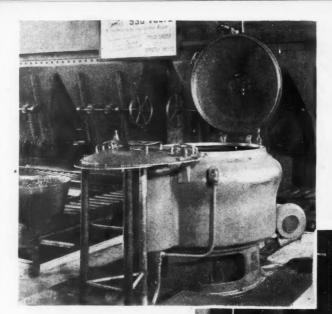


Fig. 7—Extractor Machine in Foreground ready to Spin the Basket of Chips Visible at the Left, Removing Adherent Oil by Centrifugal Force

Oil in a settling tank is allowed to stand for approximately eight hours, and is then further processed through a DeLaval Centrifuge at a temperature

through pipes to one or the other of the two 1,000-gallon settling tanks that appear in Fig. 8. This duplicate set-up enables one tank to be used for receiving oil while the contents of the other are in process of settling. By means of a built-in steam coil the oil temperature in a full tank is raised to 140 Deg. F. and maintained at this heat for a period of eight hours, thereby sterilizing the oil. This heating reduces the vicosity, enabling solid particles and sludge to fall to the bottom of the tank where such waste is drained off at intervals and discarded.

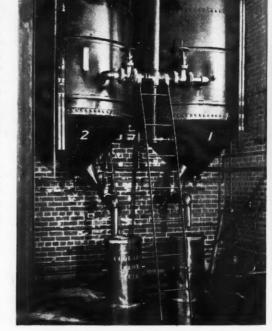
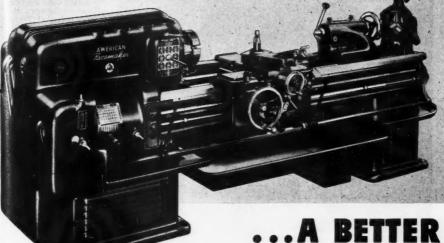


Fig. 8—These 1,000-Gallon Settling Tanks are Used alternately to Collect and Sterilize Used Cutting Oil Recovered from Chips

For Better Taper Turning-



TAPER ATTACHMENT

A brand new—greatly improved Ball Bearing Taper Attachment is now available for all sizes of "American" Pacemaker Lathes.

This new Attachment contains 24 permanently sealed ball bearings which reduce friction to an absolute minimum.

All ball bearings ride on hardened and ground steel "ways" thus insuring maintenance of accuracy and a minimum of wear.

All bearings are concealed so they are never exposed to chips and dirt. The new "American" Ball Bearing Taper Attachment is the very latest development in Taper Attachments and offers an anti-friction construction that is practical, effective and that will retain its original accuracy for a long period of time.



45

THE AMERICAN TOOL WORKS CO.

Lather and Radial Drills

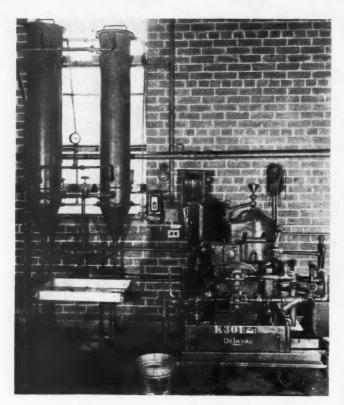


Fig. 9—The Cutting Oil is Refined by a Centrifuge Machine and then Passed through a Vertical Filter to Remove the last Traces of Water

storage tank.

Cutting oil reclaimed in this way is found to be as good as when new, and is pumped from the large storage tank to various locations in the plant for regular use in the machining operations.

The cutting oil used in machine tools throughout the plant is changed as often as is thought necessary. The various types include regular cutting

oil, lard oil, and hydraulic oil. Crank case oil in company-owned power-operated vehicles is changed at proper intervals and provides considerable used automotive oil for reclamation. Suitably marked 45-gallon drums are

of 160 deg. F. to remove water and fine sediment. Finally, by passing the cutting oil through a cotton waste filter, any remaining trace of water is extracted and the purified oil enters a 2,000-gallon underground

# famco FOOT POWERED SHEAR CUTS COSTS

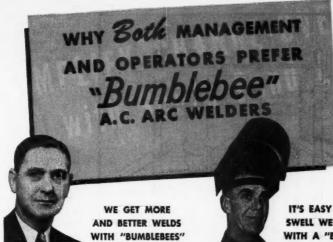
Famco Squaring Shears cut up to 18 gauge mild steel with ease. Made in five cutting widths (22" to 52"). Ruggedly built for long, hard service. All models have front, side and back gauges. Write for catalog.

### FAMCO MACHINE CO.

1324 18th St.

Racine, Wis.





Production increased 15% to 30% without sacrifice of quality.

ng ne cal he ter

renis be en is he

r-

ri-

in re-

he

ra-

oil

ne t

out

is

ten

ec-

ri-

ide

ng

nk

p-

per

ble

on.

are

1945

They consume 30% to 35% less power than D.C. welders.

They relieve overloaded power lines and cut demand charges 10% to 30%.

Because of freedom from arc blow, deposition rates can be speeded up by increasing the amperage. This often makes it possible to use larger, longer electrodes and cut down stub end losses.

Absence of moving parts, tough, heman construction and top-notch insulation assure dependable, trouble-free operation - eliminate shutdowns for repairs and replacements.

IT'S EASY TO DO A SWELL WELDING JOB WITH A "BUMBLEBEE"

There's almost no "arc blow". You can work faster in any position and you're sure of good, sound welds every time.

It's easy to produce good welds in tight spots - there's less chipping out of welds.

It's often possible to use longer and larger electrodes; there are fewer stops to put new electrodes in the holder.

· It's easy to adjust the current for different kinds of work - just turn the

 The current setting is always plainly visible on the big easy-to-read indicator. They don't require oiling or other attention. An operator can concentrate on welding.

These are a few of the advantages which make "Bumblebee" welders favorites everywhere. Others are described in Catalog ADW 53. Ask your nearest Airco office for a copy or write Dept. MM, Air Reduction, General Offices: 60 East 42nd Street, New York 17, N. Y. In Texas, Magnolia Airco Gas Products Co., General Offices: Houston 1, Texas.



OFFICES IN ALL PRINCIPAL CITIES

with the penetrating, stinging arc

A COMPLETE LINE OF A. C., D. C. AND GAS-ENGINE DRIVEN UNITS



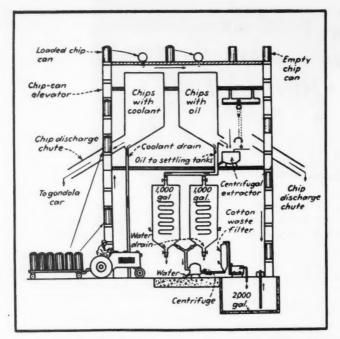


Fig. 10—Diagram Illustrating Flow Principle of Handling Chips and Cuttings for Reclamation of Oils and Solvents

chip house building, which handles one type of oil at a time. When changing from one class of oil to another, the pipe lines, filter, and so forth, are carefully drained before refilling.

#### Distillation of Varsol Solvent

A great deal of the cleaning fluid

known as "Varsol" is used in parts washing machines throughout the plant. When a quantity of this cleaner becomes too dirty for further use, it is placed in suitably-marked 45-gallon drums and transported to the chip house building. Here it is emptied into a 1,000-gallon underground settling tank and allowed to remain for several hours. From this tank the used solvent is pumped to a

kept on hand in sufficient quantity to enable separate handling of each of these different types of oil.

By far the greatest volume of oil requiring clarification is regular cutting oil. For this reason the large capacity reclamation equipment described earlier is used solely for this type of oil. Lesser amounts of other oils are processed through a separate filtering machine, also located in the

### HYBCO GRINDING HEADS

for Universal Tool and Cutter Orinders.

CHAMFER SHARPENING HEAD \*\*\*\*

Accurately Relieves Chamfers of TAPS—STEP DRILLS—CORE DRILLS—COUNTERSINKS—similar tools with evenly spaced flutes.

FLUTE SHARPENING HEAD
Sharpens Straight or Angular Flutes—
GUN OR SPIRAL POINTS OF TAPS—
Other tools with evenly spaced flutes.
Write far Circular GH

HENRY P. BOGGIS & COMPANY 1279 W. 3rd St., Cleveland 13, O.



September, 1945

Cha

the

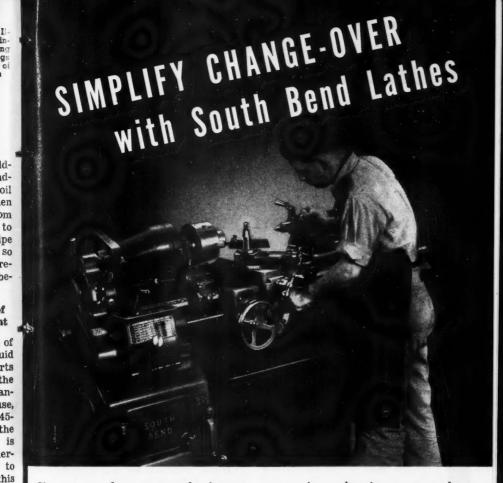
Sou

ada

into

ince

plet



Change-over from war production to the manufacture of civilian products is comparatively simple where versatile South Bend Lathes are used. Their adaptability permits getting new jobs into production quickly—with little inconvenience or loss of time. A complete line of practical attachments and

0 8

945

accessories makes it easy to tool up the lathe for a wide variety of operations. Often, the use of special machines and fixtures can be avoided, thus preventing capital losses resulting from the inevitable scrapping of costly custom-built equipment with each change in product design.

#### WRITE FOR NEW CATALOG 100-D

Illustrates in full-color and describes South Bend Engine Lathes and Toolroom Lathes with 9", 10", 13", 14\%", and 16" swings. Also, Precision Turret Lathes with \%" and 1" collet capacities.



SOUTH BEND LATHE WORKS
427 E. MADISON ST., SOUTH BEND 22, IND. . LATHE BUILDERS FOR 38 YEARS

# POWER FEED For Facing

### BORING, TURNING, FACING, UNDERCUTTING COMBINED IN ONE TOOL HEAD



Cutting bar can be set to any position in Tee slot of slide. Hardened and ground throughout. Feed screw and worm ground from solid. Gears and feed nut phosphor bronze, Head 3" dia. x 4" long. Wi. 9 lb. Any type shank furnished. Write for complete information.

CHANDLER TOOL CO.

CHANDLER DUPLEX BORING AND FACING TOOL HEAD vacuum still that operates at 400 deg. F., and can handle up to 100 U. S. gallons per hour. After passing through the still, the purified liquid is piped to a separate 1,000 gallon tank located outside of the building. From this storage tank, 45-gallon drums are filled with purified solvent and redistributed for regular use throughout the plant.

#### A Profitable Project

The chip house building and equipment was designed to handle, if necessary, twice the maximum daily amount regularly processed to date. In spite of the fact that this generous capacity has never been fully utilized, the building and equipment was almost completely paid for within two years by the savings resulting from chip and oil salvage.

Now that the initial investment can be considered as written off, the daily cost of operating the chip house to process chips and oil amounts to about 15 per cent of the value received. Thus the present method of salvaging oil and chips results in a monetary saving amounting to approximately seven times the expenditure in labor and material necessary to obtain it.

"Books, Publications, and Patents of Battelle Memorial Institute." A 72-page catalog of the publications and patents which have resulted from 15 years of fundamental and applied research has been published by the Battelle Memorial Institute, Columbus 1, Ohio. The catalog lists more than 800 general contributions, books, and patents between the years 1929 and 1944 inclusive. list includes subjects in the fields of chemistry, electrochemistry, organic graphic engineering, chemical welding technology, applied mechanics, mineral dressing, industrial physics. ceramics, fuels and metallurgy. Copies of the catalog will be sent free upon the receipt of a request addressed on a university or company letterhead.

• T

reg

100

bar

pro

its



 The DoALL has been educated to do more than regular run-of-mill surface grinding jobs. It has been designed to do all kinds of precision tool room and laboratory work.

Each DoALL has a diploma—its own tag and test bar, giving in micro inches the finish it will produce.

its weight (2200 pounds, about twice that of other

RE 7511

tool room grinders) absorbs vibration and provides a pillar of strength for the scientifically balanced mechanism. Knee room enables operator to sit and watch the work at close range. In a very short time, even a beginner can turn out perfect finishes.

Think of this-one small manufacturer used a DoALL for 58 separate grinding operations on one product.

Send for circular giving specifications and data on auxiliary equipment, magnetic chuck, selectron, coolant unit, dust collector, etc.



El Pata MAIN 7846 Telephone Yeur "DeALL" Selea and Service Serve Grant Rapids 8-0021 Heaston C 6550 Eaters City BA 502 Likraukes 180 5500 New Yerk MU 4-1514 Butford C 7136 Indonapolit El 9577 Liss Angeles 12 3371 Historapolit CL 1737 Citreds 6555

Cincinnati MAIN 3029 September, 1945

ASP 6669

Benver

Betroit TE 2-3060

CZ 1.27 Batterd

El Para MAIN 7846

Coston

Chicage SEE 1166

Lleveland

g S 12 id on g. on nt se

p-C-

ly e. nly nt hng an  $_{
m ly}$ to to eof a pli-

ry

of

ge

ts

of as

al

anen he of y,

ts,

28,

28,

es

on

on

45

Reading

Providence Wt 1515

7758 Statesuille

Minnesota

Sales and Service Store

518

3-7212

Seattle EAST 7508

**Syracuse** 

Tuksa

# GENESED ADJUSTABLE HOLLOW MILLS



Style H Facing and **Counterboring Tool** 



# **Cut Cost—Increase Production**

with GENESEE inserted blade-

ADJUSTABLE HOLLOW MILLS **FACING and COUNTERBORING TOOLS** SPECIAL PRODUCTION TOOLS

Backed by 35 years experience our Engineering Department is always ready to serve you in your Production Tool problems.

Write for complete Catalog No. 44-G

GENESEE MFG. CO.

**ROCHESTER 4, NEW YORK** 

# THE NEW CEMENT BOND on WELDISKS



# makes Bulldogs hang their heads in shame!



ABRASIVE PRODUCTS, INC. South Braintree 85, Mass.

You may send us FREE WORKING SAMPLES of your new, improved WELDISKS in the size, with the grit and for the operation

This permission to send FREE working samples places us under no specified below.

obligation except to prove to ourselves in a test run that-(1) The new WELDISK cement bond holds the grit to the backing tighter, and for longer, than any previously used bond. It makes WELDISKS the longest lasting disks ever offered to industry.

(2) WELDISK electric-furnace treated aluminum oxide is the tough-

est abrasive for this purpose and it cuts faster. (3) WELDISK double-strength, double-hard fibre, laminated with specially treated cloth, prevents edges from going flabby, the fibre from cracking and assures safety from flying particles.



Size of free sample disks should be....

(All grits from 320 to 16 available) Grits should be ...

Samples will be used to...

Shipment should be addressed

Name ....

Street and Number City State



gi-

to

ns.

945

brasive Products, Inc.

# ACCURACY **Zuality** CRITERION Boring HEADS

Since, in this case, accuracy is a degree of quality Criterion Boring Heads rate very high. Especially noted for their accuracy, they also offer other superiorities. Lead Screw ground from solid

AFTER hardening. Large offset adjustment. Interchangeable shanks. Sold everywhere. Ask your dealer. Request free literature.





945

atter all the citizate deating



"Notching" Small Drills on a Super-Cut Zurium-Bonded Diamond Wheel

The Murray Corportion of America
presents some of
the results of its research in the grinding and use of
small drills.

# Small Drills Are Important Tools!

By K. H. LUTHER

Superintendent, Portable and Perishable Tool Division, The Murray Corporation of America

MALL tools are generally regarded as being less important than large ones. Small drills, for instance, are available in larger quantities because they are used in larger quantities, they require less material to make, they can be made faster and easier, they cost less—and so the smaller the drill, the

less the importance that is ordinarily attached to it.

So far as material value is concerned, this estimate is correct, but when the moment comes that a small hole must be drilled in a piece of work—and, after all, the ultimate destiny of the drill is to drill holes—that drill be-

for

Sp



The SPARTAN Line of Hack Saws and Band Saws offer the right blade for every job, blades that today are out in front in hundreds of plants. Furnished in High Speed, Kutall Molybdenum High Speed, Flexard, All Hard and Flexible styles and Contour Cutting, Flexible back and Spring Temper Metal also Wood Cutting Band Saws.

Stocked by Distributors in your territory.

"Spartans Cut Cutting Costs"

SPARTAN SAW WORKS INC., SPRINGFIELD, MASS.

ly

n-

en ole of

e-945



Sleeve and overarm types . in several sizes. Will double output of any single spindle drill press.

Quickly adjusted to desired drill centers from 1/2" to 6".

Send for bulletin.

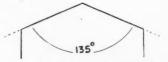
CHINE & TOOL CO., INC. 12247 COYLE AVENUE DETROIT 27, MICHIGAN

comes important. If the hole is necessary to the successful operation of the workpiece, that drill becomes as important as any tool in the shop, regardless of size or cost.

Next in importance to the drill itself is the manner in which it is prepared for use. Small drills require more careful handling than the larger



STANDARD GRIND FOR GENERAL PURPOSE WORK.



FOR STAINLESS STEEL WITH GUIDE OR BUSHING



ALUMINUM ALLOY FOR UP TO 1/8"-WITH OR WITHOUT

Correct Angles for Grinding Small Drill Points for General Purpose Drilling, for Drilling Stainless Steel, and for Drilling Aluminum Alloy

ones, and small drills that are improperly ground or improperly used can cause more trouble and waste more production-time than is ever experienced with the larger drills. To achieve best results in drilling small holes, the drills should be ground with regard for the material that is to be drilled; that is, with the point angle and clear-

Sep

# Pea-Size to Cartwheels

Whether you're looking for a grinding wheel the size of a small pea... or even smaller... or a 42" crankshaft wheel ... you can find it in the Bay State line.

ces-

the as re-

it-

reire

ger

nts ing um

pan

re ri-

ve he

rd d:

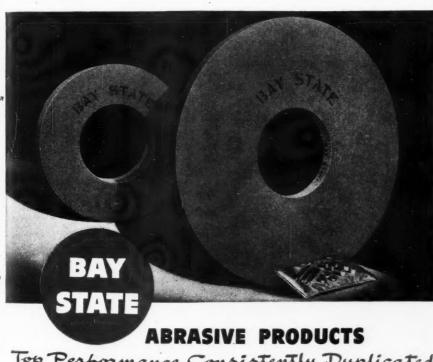
r-945

And whatever specifications you're demanding . . . in respect to bond, grain, grade, shape or structure...a Bay State product can be provided to fill the bill-the first time and whenever you require those identical . specifications.

Bay State's exclusive "fractional grading". "controlled porosity" and other features make it possible to achieve greater accuracy in meeting specifications on the original order and duplicating them exactly on each re-order.

Write us for literature on the types of grinding wheels you use.

BAY STATE ABRASIVE PRODUCTS CO. 2 Union Street, Westbere, Muss.



Top Performance Consistently Duplicated

GRINDING WHEELS HONING AND SUPERFINISHING STONES DORTABLE SNAGGING WHEELS

AND POINTS CUT-OFF WHEELS (1) INSERTED NUT DISCS (2) AND CYLINDERS







ance angle that has been found to be best for the material in hand, then the drills should be operated at the correct speed for that material.

Obviously, to obtain the best results, a considerable amount of research is necessary to discover the best angles and the best speeds. All of this ground has been covered by the engineers of the Murray Corporation of America, and the Murray Corporation is pleased to present here the results of the work of its engineers for the benefit of the industry.

When the Murray Corporation began working on war contracts, one of the most troublesome of the problems that developed was the drilling of small holes in hard steel, such as X4130 and stainless steels. The problem was complicated by the fact that most of the material was thin, highly polished, and the holes had to be drilled from all directions and from the inside of an assembly fixture into curved surfaces.

The drilling operation was performed free-hand from an under-size lofted hole, using a portable electric drill. In many instances the material could not be backed up properly, and in others an extension drill was required in order to avoid damaging adjoining parts. It was, therefore, highly important that the drill cut easily and without undue pressure.

As production schedules were increased, the use of drills increased accordingly, but it soon became evident that the rate of dulling and breaking of drills was out of all proportion to the increase in production. A general analysis of all drilling operations became imperative. Drill experts and engineers from other companies were consulted, but it soon became apparent that no one could offer much help; Murray engineers would have to find the answers themselves.

\*Uniform Temperature

**Fast Heating Portable** Handy

• The heating element in the Temco furnace operates with unusual speed. A working temperature of 1500° F. is attained in only 30 minutes and intermittent peak loads of 1850° F, are within the practical range of this rugged, long life furnace. A four point switch provides temperature control in four ranges and adjustable rheostat bands allow close heat selection within any range. The accurate, dependable pyrometer is calibrated to 2000° F. and 1100° C. in 50° increments.

\*MUFFLE CHAMBER has the exclusive feature of an embedded heating element which covers all four sides of the heating chamber. This eliminates "cold spots", assures a uniform temperature in every part of the chamber, and protects the elements against damage and oxidation.

Temco furnaces are built for either 115 V. or 230 V. Current consumption 1200 watt maximum. Heating chamber 4" wide, 334" high and deep. Outside dimensions 834"x131/2"x10". Shipping weight 30 lbs.

COMPLETE WITH PYROMETER (115 V.).....\$42.50

Easy

bac

pres

for i

60 1

strai pres die

proc

20

Sen

For 230 V.-\$5.00 additional See your supply house or write

THERMO ELECTRIC MFG. CO., 488 W. Locust St., Dubuque, Ia.

TEMCO ELECTRIC FURNACE



# AUTOMATIC PRESSURE CONTROL

# HEELIEUME

mftill
ild
in
ed
ng
minin-

acent

ng to ral

nd ere arich

# **POWER PRESSES**

Easy to set so ram automatically stops or backs off the work at any pre-determined pressure. Foot-pedal controls enable operator to use both hands. Fast, too—developing 60 ton pressure in 4 seconds! For bending, straightening, assembling, disassembling, press-fits, duplication of work pressures on die try-outs, and many other tool-room or production operations.

\$215 TO \$1398

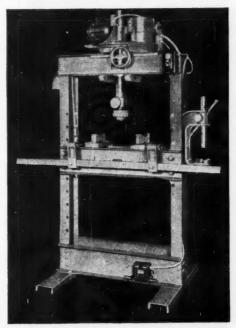
20, 40, 60 TON ELECTRIC 8 HYDRAULIC MODELS



5717 DUNHAM RD. . BEDFORD, OHIO

September, 1945

945



WRITE FOR CATALOG

MODERN MACHINE SHOP



A new type of safety clutch which releases completely and instantly when overloaded. Positive in action – accurately adjustable – they furnish absolute protection. Their rugged construction—simple design with few parts – means long trouble-free life.



Areliable series of spring-loaded slip clutches and couplings made in a variety of types. Outstanding for-reeling and winding operations-tension drag brakes - limited torque-preventing overloads and shocks-starting heavy loads-and many other uses.



WRITE TO DAY!

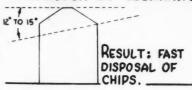
For the new series of 6 illustrated Bulletins furnished FREE upon request Featuring our complete line of Industrial Clutches and Couplings-Over-Running-Single Revolution-Friction-Centrifugal-Overload Release-Slip

THE HILLIARD CORPORATION
117 W 41h St ELMIRA N Y

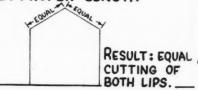
Manufacturers of
INDUSTRIAL CLUTCHES

Using the Murray Corporation's training school as an experimental department, drilling tests were conducted with drills ground to all shapes and angles, in all the different kinds of materials used in production. In the course of these tests it was discovered that, by grinding a notch in the rear of the drill lip immediately

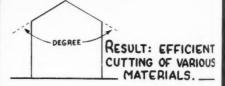
### A. PROPER LIP CLEARANCE



### B. PROPER LENGTH



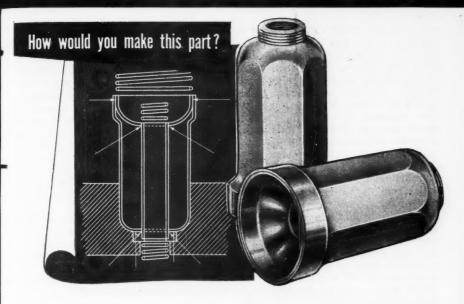
### C. PROPER ANGLE



To Obtain the Best Results in Drilling, the Drills Should be Ground with Consideration for the Factors Illustrated Above.

adjacent to the point, it was possible to increase the chip clearance, eliminate elongation of holes, prevent burning of drills, and thus increase the efficiency of the drill and decease the high rate of drill breakage.

The first step in preparing to use a small high speed drill consists in making sure that the drill is ground at the correct angle for the material



### Lepel Induction Heating makes"child's play" of many tough jobs

Here's another example of the manner in which Lepel Induction Heating simplifies and speeds difficult assembly jobs.

The assembly consists of two steel stampings, a section of seamless tubing and a part machined from brass bar stock.

Surfaces to be joined are pre-fluxed and the parts assembled in a jig with the brazing alloy or solder preplaced in the form of rings. Heat is applied simultaneously to all joints, indicated by arrows on blueprint, by means of special load coils of the Lepel Induction Heating Unit. The operation requires but a few seconds and production can be further accelerated by set-ups which make it possible to braze or solder several units while others are being assembled.

As the heat is generated within the metal itself, the brazing alloy or solder penetrates throughout the joint, insuring uniform soundness and strength with minimum use of solder or brazing alloy.

Excessive heating is impossible because time and temperature cycles are automatically controlled. There is no scaling; discoloration is minimized; finishing requirements are negligible.

Metals of any analysis-ferrous or non-ferrous-and in any form, can be joined by Lepel Induction Heating, using brazing alloys of any melting point. No special operating skill is required, yet production is speeded and costs are cut.

The same compact, relatively-inexpensive unit can be used without alteration for localized hardening, normalizing, annealing, stress relieving or melting.

Why not permit a Lepel field engineer to check your production for possible economies by this modern heating method? No obligation; just write



### LEPEL HIGH FREQUENCY LABORATORIES, Inc.

PIONEERS IN INDUCTION HEATING

General Offices:

West 60th Street, New York 23, N. Y.

DO IT FASTER, BETTER, MORE ECONOMICALLY BY LEPEL INDUCTION HEATING

September, 1945

on's ital onpes nds In disin ely 3:

ENT

OUS

the

tion

ible

iment

ase ase

use in

rial

1945

MODERN MACHINE SHOP

that is to be drilled. Drills ground at the same angle are not suitable for all types of materials. For drilling sheet aluminum up to ½ inch thick, the drill should be ground to an angle of 90 to 100 degrees, included angle, with a 12-degree clearance angle. On this material the drilling speeds should be: for drills up to ½ inch diameter, 5200 r.p.m.; for drills from ½ inch to ¼ inch diameter, 3500 r.p.m., for drills from ¼ inch to ¾ inch diameter, 2500 r.p.m., and for drills from ¾ to ½ inch diameter, 1000 r.p.m.

For deep drilling in aluminum forgings and castings, sheet aluminum over ½ inch thick, heavy extrusion and cold drawn and hot rolled and galvanized steel sheets, drills should be ground to 118 to 125 degrees included angle with 12 degrees clearance angle and with notched points. Speeds: drills up to ¼ inch diameter, 2500 r.p.m.; drills from ¼ inch to %

inch diameter, 2000 r.p.m., and for drills from % to ½ inch diameter, 1000 r.p.m.

For drilling metal having a Rockwell hardness up to 46 "C" scale, such as X4130, Chromoloy, and stainless steel, the drills should be ground to 135 to 140 degrees included angle with a 10-degree clearance angle and notched point. Speeds: for drills below ½ inch diameter, 1500 to 1800 r.p.m.; for drills from ½ inch to ½ inch diameter, 1000 to 1500 r.p.m.; for drills from ¼ to ½ inch diameter, 500 to 1000 r.p.m.

In drilling stainless steel, as soon as the drill touches the work, pressure should be applied to start drilling immediately. The drill should never be allowed to revolve against the surface of the work without actually cutting; such action will cause the stainless steel to work-harden, and it is difficult to force a small drill through work-hardened stainless

# If it's a gear ATLANTIC can make it



We have the universal equipment and the experienced personnel to produce any type of gear, standard or special, any size up to 5 ft., any material, any required quantity. Speedy, careful, courteous attention, with particular emphasis on breakdown jobs and emergency orders.

Send us your blueprints or gear samples. Write for our 111 page stock gear catalog, including chains, sprockets and reducers.

ATLANTIC GEAR

W O R K 5 200-B LAFAYETTE ST. NEW YORK 12, N. Y. Phone: CAngl 6-1440

Sep

### FOR THE FIRST TIME-

Authoritative information
about Crush Form Grinding
Precision Contours on a
Completely Engineered Machine



Results of ten years of full-time study and development are graphically illustrated in this first pictorial booklet on crush form grinding precision contours with surface grinders. Savings in time and labor and improvement of finished work made possible by completely engineered machines warrant a thorough investigation of this process. Machines also do regular surface grinding.

•	•	•		•	•	SEND	COUPON	FOR	FREE	COPY	•	•	•	•	•	•
CP			101		-	NTOUR	GRIND	ING	DEV	FIORM	ENT		ARC	OR	ATOI	

The Thompson Grinder Co. Inc., Dept. 13, Springfield, Ohio

Gentlemen: Please send me your new 16 page pictorial book describing Crush Form Contour Grinding on Surface Grinders.

Name	Position
Company	Address
City	Zone State

45

or er, k-

ch ss to

nd e-

1.; e-

on re n-

ly he it ill steel. After the drilling operation has started the operator should apply sufficient pressure to keep the drill cut-



Drawing of Small Drill Point, Showing Point Properly Thinned by Notching on a Diamond Wheel

ting until the operation is finished. This point is important.

If a drilling operation is such that the operator is drilling through two or more types of metal or other materials in one cut, he should use a drill ground to 118 degrees included angle and 12 degrees clearance angle, with notched web.

For the elimination of small drill troubles and the increase in production on small drilling operations the Murray engineers give most of the credit to the correct notching of the drill. When it was found that notching the drill reduced drill breakage and increased production, an operator was put at the task of notching small drills, using a fine-grain grinding wheel of the silicon carbide type. Inasmuch as the notch must be accurate, the corner of the wheel must be kept sharp: thus the wheel required frequent dressing to maintain the sharp corner and the maximum production per wheel averaged some 2,000 drills ground.

In an effort to reduce wheel dressing time and increase production on this operation, the Murray Corporation tried diamond wheels, and finally settled on the Super-Cut Zurium-

MEAD SPECIALTIES COMPANY

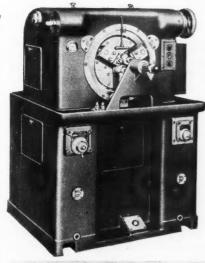
Dept. AA-95



4114 N. KNOX AVE.

CHICAGO 41, ILL.

# National Acme



rill ucthe the the

chage ra-

ing nd-

pe. cube red

the

ro-

me

SS-

on

ra-

illy

ım-

er

'll in d-

d

10

ir

n-

945



# Hydraulic Thread and Form Rolling Machine

This new National Acme production tool—a Thread and Form Roller, hydraulically operated and completely automatic—is especially built for economical production of smooth, accurate threads and forming work, to the finest automotive and aircraft precision standards.

Three threading or forming rolls, each supported by anti-friction rolls directly in line with the work, insure uniform pressure. This avoids distortion—es-



pecially important for second operation on hollow work.

Two standard heads are available and are interchangeable—one for ¾ to ¾" work and one for ¾ to 1" work—1½" maximum length. Other sizes on application.

Hand fed, this machine will turn out 900 pieces per hour, and magazine fed, up to 2000 pieces. It does not require an experienced operator, and affords unusually long life for thread rolling tools,

We'll gladly give you additional data, prices and delivery dates.

The NATIONAL ACME CO.

Acme-Gridley 4-6 and 8 Spindle Bar and Chucking Automatics - Single Spindle Automatics - Automatic Threading Dies and Laps - The Chtonolog - Limit, Motor Starter and Control Station Switches - Solenoids Centriluges - Contract Manufacturing

Bonded wheel, made by Industrial Abrasives, Inc., Chicago, as being best suited for the job. The outstanding feature of "Zurium-Bonded" dia-

ORIGINAL DRILL CONTOUR

CUTTING LIPS

DOTTED LINE INDICATES CONTOUR WITH
NEW NOTCHED THINNING. REPEAT ON
OPPOSITE SIDE.

WEB

Diagram Illustrating Principle of Notching Small Drills to Thin the Points

mond wheels is that the fine diamonds are imbedded in an alloy bond which is highly resistant to stresses and wear, yet is soft enough to wear away with the abrasion of the diamonds.

The cost of the silicon carbide wheel was \$3.50, which, upon a production of 2,000 drills, averaged \$1.75

per thousand drills ground. Added to this figure should be the overhead for the many wheel dressings necessary during the life of the wheel to keep

> the corner sharp enough for the notching operation. And the factor of time lost in dressing the wheel should not be neglected.

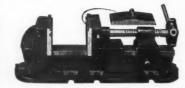
> The diamond wheel costs \$120, but from 150,-000 to 200,000 drills are ground per wheel, thus bringing the cost down to 80 cents and as low as 60 cents per thousand drills ground. But the savings on wheel cost is only one of the improvements found in grinding high speed drills with diamond wheels over silicon carbide wheels.

It was necessary to dress the silicon carbide wheel every 5 to 10 drills to keep a sharp corner on the wheel so as to get a

good square "notch." With the diamond wheel it was only necessary to dress the wheel every 4,000 to 5,000 drills. The savings in man hours on the dressing operation is very apparent.

The life of the drills ground on "Super-Cut" diamond wheels was 50 per cent longer than the drills ground

### GEM DRILL PRESS AND MACHINE VISES.

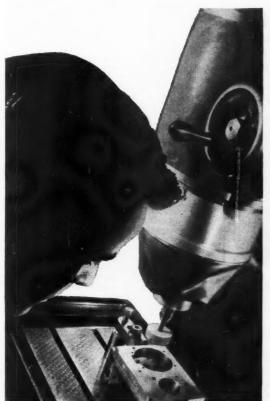


Modern Vises for Tool-room and Production. Sizes ranging from 3" to 101/4" opening. Strong, Versatile, Quick-Acting. Pay for themselves in time-saving. Write for circular describing entire line of GEM MACHINE VISES.

J. E. MARTIN MACHINE WORKS
548 State St. Springfield, Ohio

# RELOCATE FINISH GRIND HOLES TO .0001"

IN 1/3 THE TIME



No LONGER is it necessary for toolmakers to labor over buttons and locating plugs to correct holes in hardened parts... not if you use the Moore Jig Grinder.

You can rely entirely on this unique machine to mechanically relocate and finishgrind straight or tapered holes to exact size and location in 1/3 to 1/4 the time reguired by conventional methods.

Accurate lead screws built into the Jig Grinder enable operators to guide the work rapidly to precise location within .0001" at the turn of the micrometer dials. This eliminates hours of checking on the bench and surface plate.

Working to figures instead of to "fit," the Moore Jig Grinder takes die-making out of the "one-man" class and puts it on an interchangeable parts and assembly basis for the first time. Die, stripper and punch plates can now be produced concurrently with better alignment of mating parts and more uniform clearance between punch and die. Multi-section dies are quickly ground in a single set-up... eliminating separate-section hole grinding and the accompanying problems of accurately locating each section in the die bed.

MOORE SPECIAL TOOL CO., INC. 730 UNION AVENUE, BRIDGEPORT 7. CONN.

**NEW 28-PAGE CATALOG** describes Moore Jig Grind-er's application to dies, drill jigs, gage parts, master plates and production parts.





to or

ry ep gh n. st

el 1. el 0,re us

to 60

lls

on

of

in

lls

er

to

de

lls

on

a

a-

to

00

on

r-

n

50

ıd

45

Moore Jig Grinder

on the silicon carbide wheel. The quality of hole drilled was increased 100 per cent and this is one of the most important facts in favor of the diamond wheel. Another important fact is that in grinding the drills on the diamond wheel, all burning of the drills was eliminated.

In an effort to eliminate the "headaches" incidental to the use of large quantities of small drills, the Murray Corporation has developed an improvement in drill grinding technique which should be highly valuable to the industry. As a matter of fact, considering that the "notch" improves the performance of small drills, it should also improve the performance of larger drills. Inasmuch, as no drilling grinding machine has been developed thus far to apply the notch, however, it will have to be ground by the free-hand grinding method for some time to come.

SEE BETTER • WORK BETTER



ZEISS INC.

#### HEADBAND MAGNIFIER 21/4 ×

Jse of both eyes reeals true depth of setails. Magnificaon of 21/4x. Free vorking distance,

orking distance, about 8", permitting unhindered use of hands. By just lifting your head, your eyes are free for any other activity. Eyeglasses may be worn while using. Highest optical quality. Eyeshade of Tenite—practically unbreakable.

Also APLANATIC FOLDING POCKET MAGNIFIERS — 6 and 9 power



Write for Leaflet

CARL ZEISS, INC.

Dept. H-51-9, 485 5th Ave., New York 17, N. Y.

"Corrosion," a 54-page booklet issued by The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y., comprises a convenient and comprehensive analysis of corrosion principles for both the practical man and the technician in the metal field. An opening section explains how corrosion processes work and discusses all the known factors that influence their action. These discussions are illustrated with graphs, drawings, and tables.

The detailed review of testing methods that follows tells how service conditions are simulated in corrosion research. Included is a description of the construction and use of the spooltype specimen holder for determining the comparative behavior of several metals and alloys simultaneously under actual operating conditions.

The applicability of Monel, nickel, and Inconel in various corrosive media is analyzed in the closing section of the booklet, copy of which is available to equipment designers, engineers, or other metal users free upon request.

### HERCULES HOLDERS

Especially suited for parts numbering on steel, stainless steel and alloys, castings, brass, etc., these HER-CULES Holders are available in both hand and press style, for one or two line convexed or concaved marking. No parts to loosen or wear out, type is instantly interchangeable by finger pressure on clip. Made of shock-resisting steel. Write for literature.





For simplified gang-stamping with faster interchanging of type Co

to

ati

bu caj

ula

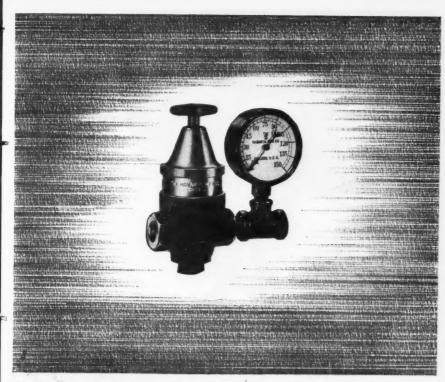
ad

air

typ

sta

ser



## Get More from Air Power...

Correct working pressure, adjustable to meet the needs of different operations, not only makes air operated equipment safer and easier to handle, but makes the most of compressor capacity, too. Hannifin Pressure Regulating Valves provide quick, accurate adjustment of working pressure for air operated units. Hannifin pistontype design allows in-

stant adjustment, and sensitive, accurate main-

tenance of reduced working pressure. Hannifin Pressure Regulating Valves are built in three standard sizes, %, ½ and ¾ inch for use on initial air pressures up to 150 lbs.

Write for Bulletin 56. Hannifin Manufacturing Company, 621-631 South Kolmar Avenue, Chicago 24, Illinois.

Hannifin

PRESSURE REGULATING VALVES

to ct, res it ice ill-ch, by for

ed C., mive for chng ses acese hs, thdireof olng

ral ler

is

to

ner

ied

ing

er

ing

## That Unseen Extra Quality



# An Accurate "Pitch" is Necessary

But absolute control of "LEAD" and "ANGLE" as well as "PITCH" is vitally important in a thread gage.

That "Extra Unseen Quality" is evident in each Republic Gage Company V-nide gage, as reports show lower production costs.

Write for V-nide folder.

## **Republic Gage Company**

GAGES OF LONG LIFE ACCURACY
2228 Fenkell Avenue Detroit 21, Michigan





Monarchi TURNING MACHINES

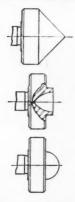
Monarch's New 10" Hi-Speed Manufacturing Turning Machine has already demonstrated its power to save time and cut costs on quantity production of aircraft and other close-tolerance work. Write for details on how this machine can save money for you on small turning work requiring a high degree of accuracy.

THE MONARCH MACHINE TOOL CO. · SIDNEY, OHIO

# ROLLER STOP and SUPPORT

The enthusiastic reception given this new Alco tool indicates that there was a great need for a combination revolving stop and support for use on screw machines. • This new tool is supplied with a rotating disc with full ball races for both thrust and radial bearings. This allows the disc to revolve at the same speed as the work and ends all friction. For clean, accurate, precision work, use the ALCO REVOLVING STOP. • The same Alco holder is used as a REVOLVING SUPPORT by easily and quickly inserting special shape inserts to fit the contour of the work end. The chief advantages of the Alco Revolving Support are the absolute rigidity which it affords on long pieces or for accurate forming, making increased feeds possible.

TO SUPPORT VARYING
SHAPES OF THE END OF
THE WORK, SPECIAL
INSERTS SUCH AS
THESE MAY BE USED.



Send for latest catalog No. 5







RELEASING TAP HOLDER ACORN DIE HOLDER



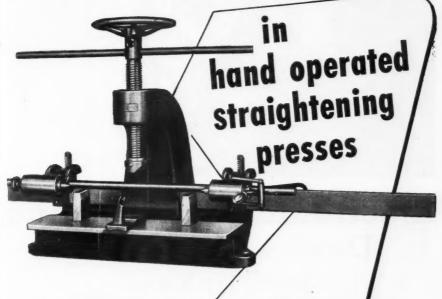


RELEASING BUTTON DIE HOLDER DRILL CHUCK

THE ALCO TOOL CO., 152 Birdseye Street, Bridgeport, Conn.
Detroit Office: 908 Stephenson Bldg., Phone Madison 5870
Chicago Office: 608 S. Dearborn St., Telephone: Webster 2868

T, CONN. U

### BIG IMPROVEMENT



The No. 576 General Hand Screw Straightening Press has many advantages. It is powerful, fast, easy to operate, rugged and simple. It is ideal for the heat treating plant or toolroom . . . in fact, wherever straightening is to be done upon a wide variety of parts. It is made by the company that has specialized in the building of power operated straightening presses for the last 21 years.

Write for New Bulletin No. 365

### GENERAL MANUFACTURING COMPANY.

6433 Farnsworth • DETROIT 11, MICHIGAN



George Corbett, blind Timken operator of new electronic sound gaging device, teaches Helen Keller the simple steps required in the inspection for size of the outer diameter of Timken Tapered Roller Bearing races.

### Electronic Sound Gaging Device Developed by Timken

Will make possible Employment of Blind Operators on Inspection of Parts

NEW electronic sound gaging device which may mean employment to thousands of America's otherwise unemployable blind was given its first public demonstration July 19th in the Canton Bearing Factory of The Timken Roller Bearing Company, Canton, Ohio.

The small audience, composed of high-ranking leaders of the blind, of industry, the American Legion, and officers of the company, watched in silence while a sightless operator quickly fed the outer races of Timken Bearings into an O.D. gage equipped with the new device—at a rate rapid enough to bear comparison with that of a sighted operator.

Manufacturing details of the device—developed by Timken engineers so that the Company could give employment to blind civilians and to aid in the re-employment of Timken veterans—will be released without charge to any interested manufacturer, according to an announcement made by a Company spokesman during the demonstration.



★ Mall Drills put extra torque into drill bits that speeds heavy production and general maintenance drilling of metal, plastics and wood.

★ Light-weight—compact design and perfect balance add to the adaptability of Mall Drills. Also reduce worker's fatigue.

★ Special steel alloy gears and self-lubricating bearings assure increased speed, cool operation and long service. Easily serviced—commutator can be inspected and brushes replaced without dismantling drill. Ruggedly constructed for long, hard usage.

★ ¼" and ½" models are manufactured for 110-volt A.C. or D.C. or 220-volt A.C. or D.C. Available on suitable priority.





n d

ging elen

teps tion diper-

g

oed

pid

hat

so

oy-

in er-

·ge

by

he

945

MALL TOOL COMPANY

7814 South Chicago Ave.

Chicago 19, Illinois

Helen Keller, flanked by Polly Thomson, her constant companion for more than thirty years, was on hand to reflect what the new gage may come to mean to thousands whose blindness keeps them from earning a living.

The Timken Roller Bearing Company, who uses the gage in the final inspection stage of its precision manufacturing, is the first industrial employer in Ohio—and one of the first in the United States—to employ blind persons. At present more than fifty partially or totally blind people are employed in various operations at Timken plants in Canton, Columbus, Zanesville, Mt. Vernon, Wooster, and Newton Falls, Ohio.

Shown at the same time was a standard Timken Outside Diameter Gage operated by a sighted employee. The standard gage, equipped with the new electronic sound device, makes up the blind operator's unit.

At a specially-built assembly line consisting of two work-benches—on one of which the new gage was installed—two operators, one blind and one sighted, demonstrated how both the standard gage and the gage for blind operators are used to precision-check the outside diameter of Timken Bearing races to within one twenty-five millionth of an inch.

Diameters of rolls, cone, and cups, the components of Timken Bearings, are ground within very close limits of their specified sizes. Each part is then checked for size in the Final Inspection Departments, where the operators use precision gages with electrical or mechanical dial-type indicators. The indicators show highly enlarged (or amplified) readings of any variations in the diameter of the work-piece being checked (in this case a bearing part). Parts with diameters over or under the specified size limit—or out of round—are readily detect-

# Here's the Problem

### Here's the \_\_\_\_\_ and here's the Answer \_\_\_\_ EASY BEVEL GEAR GAUGING

No Long Calculations No Involved Set-up

With Herkimer sine bars and bevel-gear gauges, anyone with ordinary gauging experience and ability to read blueprints can quickly and accurately check all important bevel gear dimensions and relations. Production gauging made easy.

> Write for Free Copy of Bulletin 100



HERKIMER TOOL & MODEL WORKS, 112 King St., Herkimer, N.Y.

### BELTED MOTOR DRIVEN GRINDER



Write for Catalog

Today

**Builders** of

THE STANDARD Vertical Spindle

Grinder, Tool

Post, Internal Grinders, Disc Grinders, Wet

and Carbide Tool Grinders,

line -on inand oth

for ion-

ken ntyups, ngs,

s of hen pecera-

lecicaenany

the

case

ters imit

ect-

that gives you these extras:

LOWER WHEEL at no extra charge!

#### HERE ARE THE FACTS

(a 12" 2 H.P. grinder is used for comparison)

Spindle Speed R.P.M. Peripheral Speed S.F.P.M. Motor Diameter Spindle Housing Diameter Wheel Clearance (Overhang)

DIRECT DRIVEN BELTED DRIVE (Motor on Spindle) (Motor on Back) 2 BDG 12" 12" 1750 (60 cycle) 1950 (any cycle) \*5400 16200 \*\*11" 116" 3" 1/2"

ASK FOR QUOTATION.

\*A new wheel is almost worn out at 5400 S.F.P.M. (Recommended peripheral speed is 5000 to 6500 S.F.P.M.)

\*\*Motor housing interferes with large work.

†Type BDG Belt Driven grinder reflects ideal peripheral speed on wheels.

††Type BDG spindle housing diameter permits handling large work with no interference of machine housing.

MULTIPLE SPEED GRINDERS mean multiple economy-maintain correct peripheral speed, increase production, obtain maximum usable life from grinding wheels. Sizes: 10" 3-speed 1 H.P. to 30" 4-speed 30 H.P.

### ARD ELECTRICAL TOOL CINCINNATI . OHIO

2487 RIVER ROAD

MODERN MACHINE SHOP

**Buffing and Pol**ishing Machines, Speed Lathes.

1945

September, 1945



Accuracy-to a class 4 fit when necessary-is constant -each part is tapped exactly like every other, independent of operator efficiency. AIR regulates the complete tapping cyclenot only the down stroke, but its control is so sensitive that the tap is allowed, in effect, to float out of the part. Tap life is longer—tap breakage practically eliminated. Send today for your copy of catalog on Tapping The Haskins Way. R. G. Haskins Co., 620 So. California Ave., Chicago, Illinois.



ed and thus can be removed.

To enable a blind operator to do this work with the same accuracy, a sound indicator is used on the same type of gage. There is a small, conetype speaker mounted on the back of the operator's chair and connected with the electronic device. The operator hears three different notes issuing from the loud-speaker. An article that is normal or within the size limit is indicated to the blind operator by the sound of the middle note. This means the article may be passed as meeting the rigid Timken standards. The high note indicates the article is over-size, while the low note indicated that it is undersize. At the sound of either of these notes, the operator rejects the workpiece.

The three notes are produced by an electronic oscillator which is controlled by relays connected to the three indicator lights of the electronic gaging system. The red, green and orange indicator lights correspond to the three notes of the sound device, the red being high, the green low and the orange middle. Chief purpose of the indicator lights is to give the lineman (who sets up each gage) a quick visual check on the gage's efficiency. The gage is originally set and is adjusted to a master gage and can be made to give both a visual and sound indication as close as one five-millionth of an inch over or under a specified diameter tolerance.

Captain Paul Moriarty, A.A.F. pilot who suffered the loss of his sight. a broken neck, a fractured jaw, and a chipped knee when his small spotter plane was shot down in flames over Germany, was present at the demon-Now a patient at Valley stration. Forge General Hospital, he is the first blind Timken veteran on the Com-

pany's record.

Captain Moriarty was formerly a second helper on the No. 3 furnace in the Timken Steel Mill.

## Knock-Out UNIVERSAL TOOL GRINDERS ARE READY...



MULTIPLE SPEED UNIVERSAL TOOL GRINDER



Ready! Yes, ready to serve on the tremendous job which is still ahead. When the war began knock-Out Tool Grinders were ready and served their country and Allied Nations well. Now, as reconversion becomes a reality Knock-Out Grinders are once again ready to take their place on the production line and on tool maintenance work.

For postwar production

and maintervance too . . .

A product is no better than the tools with which it is cut and shaped. Keep those tools sharp and keep them right! Whether you're using high speed steel or carbide tipped cutting tools, there is a K-O Grinder built to accommodate your needs. The low original cost and negligible upkeep on Knock-Out Grinders makes hiring others to do cutting tool maintenance highly impractical.

Knock-Out Engineers have made available more time-tested grinder fixtures than has any other manufacturer. If it can be done—it can be done more easily and economically on a K-O Grinder.

Get in touch with Knock-Out at Aberdeen or with your nearest K-O distributor.



SINGLE SPEED UNIVERSAL TOOL GRINDER



UNIVERSAL CARBIDE TOOL GRINDER



CHIP BREAKER GRINDER



K. O. LEE COMPANY--ABERDEEN, S. D.

do

cy, me ne-

of ted ra-

ng cle mtor his

ds. cle

dihe op-

an

oll-

ree

ig-

nd

to

ce,

nd

of

ne-

ck

Cy.

id-

be

nd

il-

pi-

ht, nd ter er onley rst

m-

ce

### Here's what we mean when we say ...

### 'now you can buy

THERE ARE only 24 hours in a day and nothing you can do will add to the total. But the *production* you can get out of those 24 hours can be greatly increased. You can *buy* production-time by buying the right grinding wheel for the job.

Robertson's new, Cool-Cut wheel is no cure-all for every grinding problem, but, properly applied, it can step up your production-time to a remarkable degree. Here, for example, is what a Robertson Cool-Cut did for one customer:

Using an 18" x 5" x 15" conventional wheel, on a Hanchett Vertical Surface Grinder, for .040" to .060" stock removal from 1020 steel, 5%" thick, the customer was turning out only 26 pieces in 2 hours and 40 minutes, with an ampere reading of 60. Wheel feed was two ten-thousandths per chuck revolution.

When, on the recommendation of a Robertson Sales Engineer, a W24-H-2 Robertson Cool-Cut wheel was tested on the same job, production jumped from 26 pieces to 170 pieces in the same time, with an ampere reading of between 37 and 40. Wheel feed was increased to eight ten-thousandths per chuck revolution.

In other words, the Robertson Cool-Cut wheel increased production on this particular job more than 6 times and with a substantial saving in power-cost, too! Would you like to buy that kind of production-time for your shop?

### ROBERTSON MANUFACTURING COMPANY

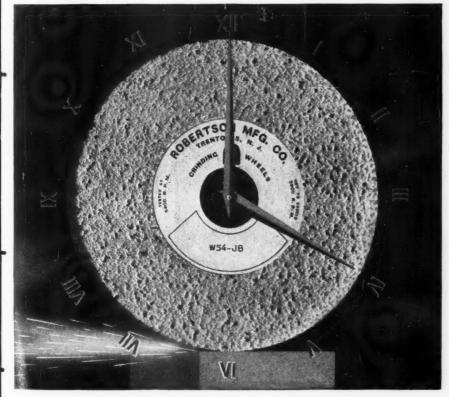
TRENTON 5, NEW JERSEY

MANUFACTURERS OF VITRIFIED BONDED GRINDING WHEELS, MOUNTED WHEELS, SEGMENTS

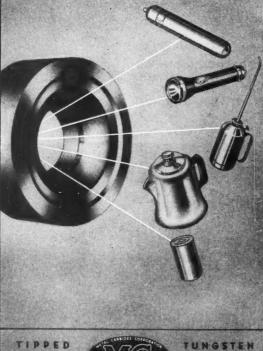
### PRODUCTION-TIME"

This pocket-size booklet, "How to Buy Production-Time," tells the full story of Robertson Cool-Cut wheels. Write, on your business letterhead, for a free copy.





### Super-hard TALIDE DIES



TIPPED TUNGSTEN CARBIDE CARBIDE

TALIDE DIES, with super-hard tungsten carbide nibs, are performing an outstanding War job today in producing millions of cartridge cases, bombs, rocket tubes, ammunition and other critically needed ordnance items.

The production advantages of LONGER DIE LIFE, MORE CONTINUOUS PRESS OPERATIONS, CLOSER TOLERANCE, BETTER FINISH and FEWER REJECTS are increasing the output of press lines all over the nation.

Tomorrow . . . these advantages plus the extra hardness, density and toughness of Talide Dies will make it possible to mass produce at lower cost deep-drawn automotive parts, kitchen utensils, flashlight cases, cosmetic containers, food and beverage cans, high pressure gas tanks and a multitude of other peace-time products.

Talide Sheet-Metal Dies, made by our exclusive Hot Press Method, are available in hole sizes up to 24". Our experienced organization is at your disposal.

### **METAL CARBIDES CORPORATION**

YOUNGSTOWN 5, OHIO

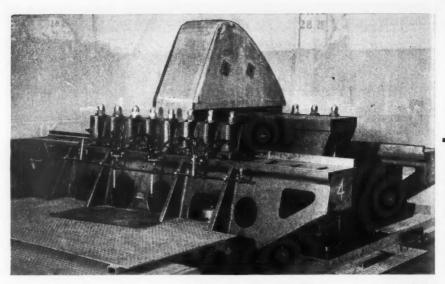
TUNGSTEN CARBIDE TOOLS DIES . WEAR PARTS

### Get the Most from Your REAMERS!

Reamers are delicate precision tools. They should be properly sharpened. They should be properly stored. They should be properly used. When re-sharpening, a fine but free cutting wheel is recommended. When transporting and storing, individual containers will help prevent accidental chipping of cutting edges.

There is a National reamer of correct design for your reaming job. For top output at minimum tool cost, specify National tools and treat them right.





Stretch Press for Forming Sheet Material. In this Press the Stretching Force is Applied by Means of a Rising Bed; other Presses Utilize Movement of Clamping Jaws to Apply Stretching Force (Douglas Aircraft Photo)

### Stretch Forming of Aluminum

For applications within its scope, the stretch-forming method of shaping parts offers advantages with which the tool engineer should be conversant.

By GILBERT C. CLOSE

FEW manufacturing processes have skyrocketed to widespread acceptance more rapidly than the stretch press method of cold forming aluminum. This does not, however, mean that the stretch press is a new development. More than 20 years ago, the German Junkers fac-

tory was employing crude stretching equipment in the production of various aircraft parts.

Stretch pressing was introduced to American industry in the early 1930's. The lag in the development of the process can be traced to a lack of understanding of the metal-



#### TROUBLE CHASER!

Even though carefully hand driven, and then smoothed up, slotted screws spelled trouble for this well-known typist's chair manufacturer. Some burrs got by inspectors, snagged steno's stockings.



#### OUTPUT PACER!

But burrs became a memory when he switched to Phillips Recessed Head Screws. Better still, workers, freed of the dangers of finish-scarring driver skids, boosted output plenty with fast power-driving.

. . . . . . . . . . . . . . .



#### **FUTURE FACER!**

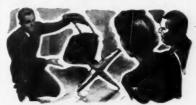
ems

orce oto)

ng ri-

to

rly nt al-945 Because they are engineered to take top driving pressures, Phillips Screws help designers improve product strength and rigidity. With stronger, tighter fastenings, any product is in better shape to meet coming competition



#### ORDER PLACER!

At the point-of-sale, the Phillips Recess' eye-appeal will help to get the order. Burr-free, blending with any product's beauty-it's the finishing touch that softens the toughest prospects!

### hillips.... the engineered recess!



In the Phillips Recess, mechanical principles are so correctly applied that every angle, plane, and dimension contributes fully to screw-driving

- ... It's the exact pitch of the angles that eliminates driver skids.
- . . It's the engineered design of the 16 planes that makes it easy to apply full turning power - without reaming.
- ... It's the "just-right" depth of recess that enables Phillips Screw Heads to take heaviest driving pressures.

With such precise engineering, is it any wonder that Phillips Screws speed driving as much as 50% - cut costs correspondingly?

To give workers a chance to do their best, give them faster, easier-driving Phillips Recessed Head Screws. Plan Phillips Screws into your product now.

WOOD SCREWS . MACHINE SCREWS . SELF-TAPPING SCREWS . STOVE BOLTS

erican Scraw Co., Provide

. . . . .

The H. M. Harper Co., Chicage, III.
International Screw Co., Datrolt, Mich.
The Lamson & Sessions Co., Claveland, Ohia
Manufacturers Screw Products, Chicage, III.
Millford Rivet and Machine Co., Milferd, Con
The National Screw & Mfg. Co., Chrodiand, Ohi

· · · Made in all sizes, types and head styles · · · · · Phoell Manufacturing Co., Chicago, III.
Roading Scraw Co., Marristawn, Pa.
Russell Berdooil & Word Balt & Mer Co., Part Choster, N. Y.
Stavill Manufacturing Co., Waterville, Com.,
Shakeprool Inc., Chicago, III.
The Seathington Restures Mfg. Co., Southington, Com.,

### BURKE MILLING MACHINES



No. 4 Motor Driven MILLING MACHINE Mounted on Cabinet Column

Burke motor driven milling machines Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

Write for complete information.

#### BURKE MACHINE TOOL CO.

297 E. 16th St.

Conneaut, Ohlo

lurgical principles involved, and to the initial practice of building stretch presses narrowly limited as to the type and size of work for which they could be adapted.

Most stretch pressing information currently available deals with machines especially designed for the forming of specific parts. Now, with highly versatile equipment the order of the day, it is time to survey the process through the eyes of the production engineer interested in speed and economy of manufacture, the process engineer interested in quality, and the design engineer interested in simplification, weight-saving, and maximum accuracy. The modern stretch press, adaptable to a wide variety of forming operations. has much to offer toward each of these goals.

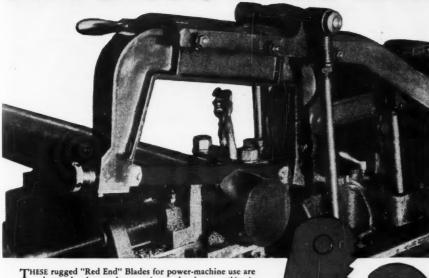
The basic metallurgical principle involved in stretch press forming is an application of stress-strain theory wherein the metal is stretched beyond its elastic limit as it is forced to conform to the contours of a die or form block. By exceeding the elastic limit of the material involved, residual stresses which tend to pull the material back to its original form are eliminated.

One of the most important applications of stretch pressing is in the production of parts requiring double-curvature forming. In this conjunction, the desired results ore obtained by elongating all sections of the part rather than by the metal flow and shrinkage process common to other cold forming methods.

The important role that the stretch press has assumed in aircraft manufacture is best illustrated by the number and diversity of parts currently being produced in this manner. The list of such parts includes sea plane floats, engine cowl sections, landing gear fairings; fuselage skin sections, wing tip bows,

Get More Cuts Per Hour and More Hours Per Machine with

SIMONDS "Red End"
HACKSAW BLADES



THESE rugged "Red End" Blades for power-machine use are made to take the toughest service, and to keep on taking it. Smoother, straighter cutting ... higher production ... longer blade life ... all these extras are now possible through Simonds 100% quality-control, and through Simonds new scientific method of tensioning power hacksaw blades to each particular job on which they are used. "Red End" Blades are made from Simonds own special electric steel, either standard, molybdenum, or high-speed. Order from your dealer now.

SEE SIMONDS NEW SOUND FILM, 16 mm in full color, showing how to choose the right "Red End" Blade for each job, and how to get the most out of it on the job. Have your dealer arrange to show it to your operators, in your own shop, without cost or obligation.

BRANCH OFFICES: 1350 Columbia Rd., Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Ave., Portland 4, Ore; 31 W. Trent Ave., Spokane 8, Wash.

PRODUCTION TOOLS

FOR CUITING METAL,

PAPER, PLASTICS

SIMONILAS SAWAND STEEL GO. SAWAND STEEL GO.

CUT THE WAR SHORT ... BUY WAR BONDS ... AND THEN BUY MORE WAR BONDS

September, 1945

to

ding las

for

tion mathe with rder the propeed the ualtersav-The o a ons. of iple g is ory beced die las-

ved.

pull

inal

pli-

the

ble-

inc-

ned

art

and

her the air-

ted

of

rts

owl ise-

ws,

MODERN MACHINE SHOP



Wing Stiffeners Formed in the "W" or "As Quenched" Condition by Stretch-Forming in a Horizontal Stretch Press. Stock: 0.040 and 0.051 Gage (Douglas Aircraft Photo)

leading edges, and exhaust manifold and cockpit enclosures.

Recen't developments in stretch presses, the use of which makes it possible to form extruded stock, promise increased latitude in other and interesting directions. The possibility of forming wing spars and other highly stressed primary structural components is not being overlooked.

The uninitiated may question the advantage of stretch press forming over older forming methods and equipment such as the drop hammer, deep drawing, and hydropress. Real advantages accrue from several inherent characteristics of the process, the magnitude of each being governed by the nature of the operation involved. Three advantages of particular interest to the aircraft industry are economy, versatility, and the adaptability of the stretch press for turning out duplicate parts within a narrow margin of tolerance.

The economy of stretch pressing begins with the initial purchase of equipment. Stretch presses are much lower in cost than either mechanical or hydraulic presses capable of handling work of equal size. Economy is further emphasized by speed of operation, minimizing of rejects once a definite production program has been established, and the low cost of form blocks or dies necessary for producing specific parts.

Versatility, a recent innovation in stretch pressing equipment, is a distinct advantage in aircraft work where production runs on any specific part are generally limited. Presses currently available are adjustable within a wide range for handling work of different sizes and shapes. This factor alone is largely responsible for the increased interest in stretch press equipment.

The third advantage—the ability of the stretch press to turn out duplicate parts within a narrow range of tolerance—is of vital interest to precision-conscious aircraft engineers. The processing of large, thin sheet metal parts accurate enough to meet precision requirements for assembly line production of aircraft has always posed a problem. The inherent characteristic of stretch press form-

### sossner's mirror finish

less friction · greater wearresistance · finer part finish

This Sossner developed finish is now included on ALL of our taps . . . after scores of unsolicited letters to us gave ample proof of its superior performance.

Manufalli de la companya dela companya dela companya dela companya de la companya

TAPS GAGES STEEL STAMPS AND DIES

GRAND STREET, NEW YORK 13 or 27 BROADWAY, LYNBROOK, N.

in a

oto)

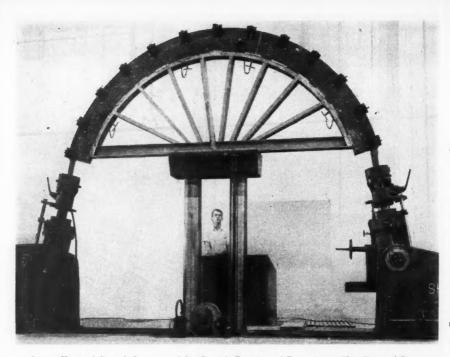
ndy is era-

e a een orm lucin disork

eific sses able ling

pes. nsiin lity ıplie of preers. neet neet ably ays rent

rm-1945 SOSSNER.WY



Large Vertical Stretch Press used for Stretch Forming of Extrusions. This Type of Press
Promises Interesting Developmen... (Douglas Aircraft Photo)

ing to eliminate the "spring back" tendency of formed sheet metal parts is a long stride in this direction. Hand fitting of parts during assembly is greatly minimized, along with "cans" and other air surface imperfections always associated with handwork operations.

Several types of stretch presses are available, each incorporating various conveniences and modification possibilities. In general, however, all stretch presses may be classified according to the method used in applying the stretching force to the metal. The first presses available utilized a rising bed, hydraulically operated, to apply force to the metal in process. This design is still used.

A form block conforming to the desired shape of the finished part is located on press-bed and the bed is raised by means of a ram, forcing the block into the metal sheet. The sheet is anchored at each end by appropriate clamping jaws anchored to the frame of the press. The principal objection to this type of action however, is that the angle between the clamping jaws and form block varies as the press bed moves upward. This variation may result in torn and ruptured metal along the edge of the form block, necessitating rejection of the part.

More recent press-designs utilize movement of the clamping jaws as a means of applying stretching force. The jaws are adjustable angularly from the horizontal to well past the vertical position, making it possible to adjust the jaws prior to stretchte

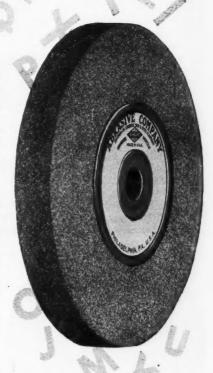
ti

### GRADE

It takes all of 23 letters of the alphabet to designate all the grades of hardness which are available in Borolon and Electrolon Grinding Wheels. But, this wide range of grades from "very soft" to "very hard" is necessary to enable Abrasive Company to meet the very diversified requirements of industry for grinding every type of material on every kind of machine, at varying speeds, for every type of grinding from snagging to fine finishing.

For such minute gradations made in thousands of combinations of different abrasive types, grain sizes and structures, intricate control of processes is required. The highest ceramic and engineering skill with unending tests and inspections are essential. Job performance and increasing industrial preference for Borolon (aluminum oxide) and Electrolon (silicon carbide) wheels and other abrasive products are forceful testimony of Abrasive Company quality.

Abrasive Company Distributors can supply from diversified stocks just the right wheels for your selective service requirements.







Division Simonds Saw and Steel Company

The correct grade of hardness in every Borolon and Electrolon Grinding Wheel is assured by various check tests with special equipment.

ABRASIVE COMPANY, PHILADELPHIA . DISTRIBUTORS IN ALL PRINCIPAL CITIES

September, 1945

noto)

d is

the heet

pri-

the ipal owthe ries This rupthe n of

ilize

as a

orce. arly

the sible

tch-

1945

MODERN MACHINE SHOP

ing so that no angle exists between the edge of the form block and the metal being processed. Experience proves that this is a definite factor in minimizing losses due to torn metal and rejected parts.

One distinct advantage of stretch press forming is the ease with which form blocks or dies may be constructed, and the many materials available from which they may be made. The more important materials that have been used in this conjunction are:

- 1. Wood
- Kirksite "A" (a lead-zinc base alloy)
- 3. Cast iron.
- 4. Masonite
- 5. Concrete
- 6. Cast and cloth-based phenolic resins
- 7. Composite materials

The selection of the type of material to use will depend upon the use to

which the block will be subjected.

The quantity of parts to be produced, the contour or configuration of the finished block, and the stretching force that will be applied during forming must all be taken into consideration when selecting form block material. High form block costs may be the most economical in the consideration of large production runs that would require frequent replacement of cheaper blocks.

Wood and Kirksite form blocks have been widely used in aircraft work. Both of these materials exhibit good strength characteristics, and the wearing qualities of each will outlast the usual small production runs common to aircraft fabrication. Kirksite is especially favored due to the possibility of salvage by recasting old form blocks into new, and to the inherent "greasiness" of Kirksite metal which reduces friction between the form block and the metal in pro-



ed. pro-

tion

etchring

con-

lock costs

the

etion reocks

raft

xhi-

and

out-

runs irk-

the

ting

the

site

reen

pro-

ion,

out-

hev

ling

k-

ear

iick

Dial.

5,

945

Deep Drawing High Chrome Steels to 28" ... another tough job licked by

#### TIMKEN GRAPHITIC STEELS

GRAPH-MO PUNCHES AND GRAPH-TUNG DIES have lowered costs of deep drawing hot rolled chromium-molybdenum steel gas cylinders up to 7" diameter and 28" length for a leading New Jersey manufacturer.

HIGH WEAR RESISTANCE AND MINIMUM METAL PICKUP, outstanding characteristics of the five unique Timken Graphitic Steels, were an essential in these operations, since the cylinders have to meet rigid specifications for strength, weight, scratch-free smoothness, and dimensional uniformity.

CONTAINING FREE GRAPHITE, Timken Graphitic Steels also offer good machinability, excellent response to heat treatment, and less tendency to scuff and score steels.

TRIM YOUR TOOL AND DIE COSTS for the coming tough competition by using Graphitic Steels on the many jobs where they will pay off in handsome savings. Available from MILNE warehouse stocks. A booklet "Timken Graphitic Steels," 48 pages, fully illustrated, telling how and where to use them, will be sent on request.

> FREE - A new bar color identification and heat treating wall chart on Graphitic Steels. Ask a Milne representative, or write or 'phone any address below.



\* NEW YORK 14 741 Washington St.

\* BOSTON 9 109 Broad St.

\* PHILADELPHIA & 337 No. Orianna St

\* FIVE CONVENIENT WAREHOUSES CONNECTED BY BELL SYSTEM TELETYPE

\* CHICAGO 7 17 N. May St. \* PITTSBURGH 19 604 Frick Bldg. WASHINGTON 4. D. C.

OFFICE 900 F St. N. W.

Get it FASTER from STOCK from mirueKOLORKOTE TOOL STEELS High Speed, Alloy, and Carbon HOLLOW, SOLID, AND AUGER DRILL STEELS for all mining and excavation work BYERS GENUINE WROUGHT IRON BARS To A.S.T.M. Specification A-189 To A.A.R. Specification M-302 To U. S. Navy Specification 46-1-7C of May 1, 1944 TIMKEN GRAPHITIC STEELS Machine Faster Wear Longer STRESSPROOF T.M. Rog. U. S. Pat. Off. STEEL COLD DRAWN - FURNACE TREATED "More than just strain-relieved." "HIGHER IN-THE-BAR PHYSICALS" HITRALLOY --also carried in Warehouse Stock. cess during stretching. This latter factor contributes to economy in the use of forming lubricant, which in turn minimizes the danger of the lubricant "piling" on the form block and preventing the metal in process from assuming the true contour of the block.

Kirksite form blocks are sand-cast at a relatively low melting temperature, and require only surface grinding and polishing prior to use. In ordinary stretching work, when no points of extreme pressure are encountered, Kirksite blocks have been used for as many as 4000 parts without replacement. Worn Kirksite blocks are easily rebuilt by metallizing with the parent metal over worn areas, then regrinding to the proper tolerance of contour.

Wood blocks are limited in use to relatively short production runs, and where extreme stretching pressures will not be encountered. Metal inserts are often employed to reinforce wood blocks at high pressure points. Low costs feature wood form block construction. Accurate cost records show that such blocks may be produced for from \$30 to \$35 per square

foot of stretching surface.

When the ultimate in wear and strength is required, polished cast iron is the ideal form block material. Such blocks will withstand extreme forming pressures without deforming and with a minimum of wear. Though cast iron lacks the lubrication characteristic of Kirksite, the coefficient of friction between cast iron and aluminum is low enough to keep forming friction at a minimum.

Concrete and the various cast and cloth-based phenolic resins have proved to be good form block materials in certain applications. Such materials, however, should not be considered for high pressure forming operations. The tendency of



FRONT LEVER BENCH PUNCH

Capacity 7/16" hole through 1/4" steel or equal

Round, square, flat, and oval shaped punches and dies stocked

Send for Catalog No. 8 which covers our line of hand operated tools. 317 East 47th St., New York 17

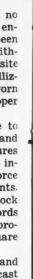


25,000 Rpm. Increased-power pneumatic die grinder. Compact, one-piece housing. Holds 8-hour oil supply. Special air-cooled cylinder. There's a Keller Die Grinder to meet your needs. Write for Catalog No. 11.

KELLER
Preumatic Tools

KELLER TOOL COMPANY, 4509 MILTON STREET GRAND HAVEN, MICHIGAN





rial. eme rmear. icathe east to um.

and ave ock ons. not

of

rm-

D











This 6-foot drive shaft, 41/2" in diameter, needed building up. Worn spots were two bearing surfaces and a center section. Only three days were allowed for completing three shafts, so the shop handling on each unit simultaneously, using Sprasteel 40. Machining to size followed, and the shafts were back to work ahead of schedule. When your machinery needs overhauling, consider Metco metallizing for the time it saves. Details on thousands of uses appear in Metco News. Coupon brings latest issue.

MAIL COUPON FOR FREE SALVAGE DATA

### REG.U.S. PAT. OFF.

WORLD'S FINEST METALLIZING EQUIPMENT

METALLIZING ENGINEERING CO., INC. 38-22 30th Street, Long Island City 1, N.Y.

Send Metco News, Vol. 3, No. 4-also descriptive literature on equipment.

Name.

Company

Address

#### ARE YOU SALVAGING



### ALL ESSENTIAL METAL CHIPS AND LUBRICANT?

Salvage is a critically important item these days. Serious shortages exist and you can't afford to lose precious metal chips and lubricant because of inadequate recovery methods.

The Doyle Vac-It segregates metals and lubricants at the source. It saves man-hours and machines; prevents accidents, improves production, assists in holding closer tolerances, and helps you comply with the salvage program. Added to all this, it saves you money by low-cost recovery of metal chips and lubricants.

If you have a troublesome cleaning problem, consult Doyle at once. Doyle equipment and experience are the answer to industrial cleaning jobs of most every description.



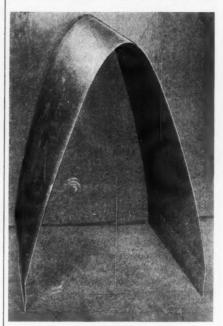
Doyle VAC-IT

DOYLE VACUUM CLEANER CO.

3225 Stevens St., S.W., Grand Rapids 7, Michigan

these materials to chip and crack along the pressure edges can be minimized by "casting in" reinforcing materials such as expanded metal lath, wire, and so on. Deformation during stretching can be controlled by incorporating I-beam construction as a basis for block strength.

It is extremely important that any form block be sufficiently strong to withstand deformation during stretching. The metal in process will con-



Leading Edge Section Formed in a Single Stretching Operation. Stock: 0.051 Gage. "W" Temper. Height of Formed Piece, 39 Inches. (Douglas Aircraft Photo)

form to the shape of the deformed block, and the net result will be a part that must be rejected. It is also important to remember that reentrant curvature is impossible when the stretch press method is used. When a string is drawn taut across the surface of any form block, it must When you purchase
BEARING
BRONZE

### Look for this LABEL

When you specify Johnson UNIVERSAL you get the highest quality bearing bronze on the market. This quality is apparent when you purchase the bar and definitely proved when you put it to work. The long hours of satisfactory performance... the smooth, quiet operation will convince you that you cannot buy a better bearing bronze.

There is only one way to prove this. Try a bar on your next job. Compare it with any bronze you have ever used. Then you . . . like thousands of other manufacturers . . . will consistently specify Johnson UNIVERSAL Bronze. Write for list of stock sizes.

JOHNSON SLEEVE BEARING 590 S. MILL STREET



BRONZE
HEADQUARTERS
NEW CASTLE, PA.

September, 1945

ck

be rctal

ion led ion

to ch-

hes.

ned

lso en-

hen sed. oss

ust 1945

MODERN MACHINE SHOP

follow the block from end to end without leaving the surface.

Not all aluminum alloys are applistretch press forming. Among those more universally used are 24S in the "O", "as quenched," and "T" tempers, 61SW and 61ST, 53SW and 53ST, and the non-heat treatable alloy 52SO and 52S-1/2H. The new ultra-strength aluminum alloy, 75S, is very adaptable to stretch press forming in both the "O" and "W" tempers, but will fracture when subjected to severe forming in the "T" temper.

There are several advantages in stretching the metal while in the "W" or "as quenched" condition. (In this conjunction remember that 24S does not assume a true "W" temper, but rather a temper similar to the "W" directly following solution heat treatment and prior to age hardening.) This is true especially if a considerable degree of elongation will be required during forming. Also, elmination of the solution heat treatment after forming does away with the serious warpage always concurrent with this process. Little, if any, warpage occurs from the precipitation aging treatment given to certain of the alloys.

When but a slight amount of forming is necessary, and when such forming requires evenly distributed elongation throughout the area of the metal in process, stretching in the "T" or fully hardened condition is possible. The inherent tendency of stretch pressing to eliminate objectionable spring-back will make possible narrow tolerance limits while working with metal in this condition.

Metal formed while in the "W" condition is susceptible to corrosion, and unless cleaned immediately following forming, corrosion will start within a few hours. Metal formed in the "T" condition does not exhibit

### Salvage Defective Castings by the New Mogul



Patented

### Cold Weld

Reclaim defective ferrous and non- ferrous castings without fear of setting up residual stresses, or crystallization. It affords a fast fill-in of aluminum, nickel, bronze or zinc which can be applied to any metal and is readily machineable. Dot-Welding is also being used for press fit work, local nickel clad to eliminate corrosion and other applications.

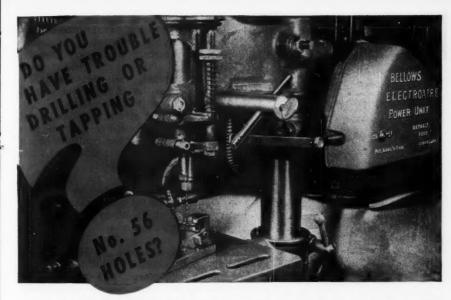
DOT-WELDING UTILIZES the new Mogul Quench-Arc-Weld Machine, a high amperage, low voltage unit, and the Dot-Weld Pistol. This combination affords a depth of penetration up to 1/32". The air pressure unit of the pistol quenches the arc in a constant stream of air.

Write for New Bulletin.

#### METALLIZING COMPANY OF AMERICA INDUSTRIAL DIVISION

1330 Congress Street, Chicago 7 135 Cedar Street, New York 6

Weld Machine



### ELECTROAIRE POWER FEED Is Cutting Spoilage and Tool Breakage Almost in Half

If you drill, ream, or tap small holes the Bellows Electroaire Power Feed will help you obtain more production, with less tool breakage, and fewer work rejects.

At the touch of a foot pedal the Bellows Electroaire Power Feed advances the tool through the work with perfectly balanced feeding pressure. In drilling the feed automatically slows at the "break through", preventing "hogging" and drill breakage. Individual speed controls permit unlimited variation of feed and retraction speeds. In tapping the top can be made to almost

"float" out with no strain on the thread angle.

The Bellows Electroaire is enabling even comparatively inexperienced operators to produce precision work hour after hour with minimum physical effort—and, from honest records, with less than half the tool breakage, less than half the expected rejects.

Bellows Single action Electroaire to fit 14" Drill Press, complete with foot control, Pressure regulator, gauge, automatic oiler and quick coupler. 110 volt, 60 cycle. Easily installed \$138.00 f. o. Akron, Ohio. Other single or multiple action Electroaires to fit any standard drill press, up to \$158.50.

### The Bellows Co.

naent the ent ny,

ta-

ain

mich ted the the is of ect-05. ile on. onon, folart ned

bit

ESS

) a

and

out

ual It

ım,

can

ld-

ess

to

ew

Ma-

OW

eld rds to of n a

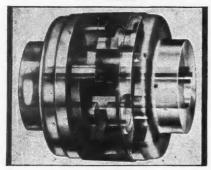
CA

**rk 6** 945

#### INGENIOUS NEW PRINCIPLE "OP" MULTIFLEX COUPLINGS

#### THREE UNIT SAFETY SMOOTH DESIGN

PATENT NO 2271548



#### A MASTER-PIECE FOR PRODUCTION

Today - and in the tomorrow - the transmission of power is a vital factor. MULTI-FLEX COUPLINGS were designed to transmit that power under all conditions. MULTI-FLEX COUPLINGS give greater MULTI-FLEXIBILITY against heavy shock and pulsating loads in any direction, also compensating for ANGULAR and PARALLEL MISALIGNMENT. So — for insured production order MULTIFLEX COUPLINGS.



this tendency to corrode.

When designing a part to be formed on the stretch press, it is important to make certain that every fiber in the metal will be stretched beyond its yield point, and that the strain in every portion of the sheet will be greater than that necessary to produce the yield stress. The ability of the metal in process to "set" in true conformance with the contours of the form block is entirely dependent upon this principal.

When a piece of metal is bent in the usual manner, the axis of the bend falls within the plane of the This bonding action gives metal. rise to tensile forces beyond the axis of the bend, and to compressive forces inside the axis of the bend. Such forces tend to hold the metal to its original form, and are responsible for the spring-back encountered in ordinary forming work.

When the metal is formed on the stretch press, and when all portions of the metal are stressed beyond the elastic limit, the axis of the bend leaves the metal plane, moving inward along the radius of the bend. Thus all residual forces set up are unidirectional and, although there may be an inappreciable amount of shrinkage in the direction of part curvature, all tendency to deform or the original shape reassume eliminated.

The plastic working range of any metal is bounded on the lower extreme by its yield point and on the upper extreme by its ultimate The wider the plastic strength. working range, the greater the amount of cold work possible without injury to the material. This principle applies in stretch press forming as well as in all other forming processes. It thus becomes evident that when extreme forming is required, metal with a wide plastic working range must be selected.



### Easier with OILSTONE FILES



OILSTONE files are abrasive files and they're all file, not just rows of cut teeth. But their main utility in production and rework finishing of machined parts lies in their ability to perform light, offhand stock removal operations after machining, but within the original tolerance limits.

Whether on revolving work or stationary bench pieces, the hard, sharp abrasive crystals in oilstone files, shaped for conformity to work contours, quickly but delicately remove burrs and sharp edges, refine radii and bevels, or eliminate the binding of mated parts.

India (Alumium Oxide, oil filled) and Hard Arkansas (natural abrasive) Files offer Industry a complete size and shape range of over a hundred items with a finish spread from coarse, medium and fine India to the surgical fineness of Hard Arkansas.

Ask your Behr-Manning Field Engineer or your friendly distributor salesman about Norton Abrasive Oilstone Files. New color chart, "Industry Oilstones," available on request.



ned

ant in

ain

be

ro-

of

in the the ves

the ons the end innd. are

of

art

or

is

ny

ex-

the

ate

tic the

th-

his

ess mvi-

is

tic

ed. 945 BEHR-MANNING . TROY, N. Y.

(DIVISION OF HORTON COMPANY)

ALSO QUALITY SANDPAPERS SINCE 1872

When the material in the fully hardened condition does not provide this range, softer tempers will have to be used or alloys with a wider working range selected.

Elongation of the metal in process during stretching results in a slight reduction in thickness. A general rule in estimating thickness reduction is to consider it approximately equal in per cent to 40 per cent of the total elongation. Thus if the material were elongated 10 per cent during stretching, the estimated loss in thickness would be 40 per cent of 10 per cent, or a 4 per cent reduction from the original thickness.

According to Poissen's Ratio, metal in process of stretching in the press should contract spontaneously opposite to and in the same plane with the direction of the stretching force. In theory, this would minimize thickness reduction. This law will hold when stretching narrow parts. With

wider parts, however, this opposite horizontal contraction occurs only along the edge of the sheet while the more central portions are unaffected. The advantage thus gained, due to the maintenance of sheet thickness along the edge, aids substantially in preventing tear and rupture.

Aluminum formed in the stretch press undergoes the usual physical changes associated with any cold working practice. The ultimate and yield strengths of the metal increases and its plastic range is narrowed. The amount of change is entirely dependent upon the amount of cold work performed, and with most parts will vary throughout the area of the part in direct proportion to the amount of forming required. Thus it is almost impossible to arrive at specific values to be expected from parts formed by stretch pressing. Of course, when subsequent heat treatment is performed, the physical



site only the ted. to ness y in etch ical cold and ses ved. rely cold arts the the s it at

om Of eatical

945

FINE ACCURACY?

The FONDA-developed special Stabilizing process enables FONDA gage blocks to pass the highest stability tests that the National Bureau of Standards has devised. FONDA gage blocks also possess the remarkable new."Ultra-Finish"...with gaging surfaces practically devoid of "peaks"!

All of which means that FONDA gage blocks establish higher standards of fine-precision accuracy—and maintain such accuracy, without appreciable loss, over long-extended periods of service.

The question sometimes is asked whether such extremely close accuracy is required by the average shop or laboratory.

Let us show you why it pays any shop working to the thousandth of an inch, or finer. Remember, too, no expensive premium is charged for FONDA longer-lasting precision.



#### FONDA GAGE COMPANY

Stamford, Connecticut

Agents in All Principal Cities throughout the World



PASSED HIGHEST TESTS DEVISED BY THE NATIONAL BUREAU OF STANDARDS

values derived from stretching will be superseded by the physical values common to the heat treatment practiced.

The recommended procedure for instituting a program of stretch press production is to proceed cautiously, perform actual production tests, and to subject parts produced in this manner to both physical and metallurgical tests. At first glance such a procedure may seem cumbersome, but experience gained with specific equip-

#### M-D Facing Heads With Automatic Food

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

MUMMERT-DIXON CO. HANOVER, PA. 120 PHILADELPHIA ST.



surface...quickly and effortlessly. The Sand-O-Flex is a brush-backed sander that produces finest results on the most difficult jobs. Available to fit either "" or "stationary or flexible motor shaft. Approx. weight, 2% lbs. fully loaded. Uses any abrasive. By changing the grit, it can be adapted ta hundreds of uses. See your dealer or write.

SAND-0-FLEX CORPORATION Hollywood 27, Calif. 4373 Melrose Avenue

ment will soon pay big dividends. The ability to turn out anything from an entire fuselage section to a wing bow or spar cap in a single operation, and the fact that such parts can be duplicated in rapid sequence and within narrow tolerances, makes the initial effort of getting acquainted with both the process and equipment a good investment of time and money.

"Apprenticeship Program of the Canadian National Railways," The apprenticeship program in operation in many of the shops of the Canadian National Railways is described in detail in this 16-page attractively illustrated pamphlet. The comprehensive explanation of this multitrade program is reprinted from an address by A. H. Williams, General Supervisor of Apprentice Training of Canadian National Railways.

The program in its entirety covers the training of apprentices for all-around skilled work as carmen, boilermakers, blacksmiths, electricians, machinists, molders, patternmakers, painters, pipefitters, sheet metal workers, and upholsterers. Copy of the booklet may be obtained by writing to the Apprentice-Training Service, War Manpower Com-mission, Washington 25, D. C.

Gorham W. Woods Joins Lincoln Electric The addition of Gorham W. Woods to its engineering staff has been announced by The Lincoln Electric Company, Cleveland, Ohio. Joining the company as research engineer, Mr. Woods will devote a major part of his time to the development of electrodes, a post for which he is well qualified in view of his many years of experience in the field of chemistry and metallurgy.

Keyway Cutters When You Have a Tough Job To Lick

QUALITY TOOL WORKS ILLINOIS WAUKEGAN



Whether you have one or one hundred chippers, our "cutting efficiency service" is available to you. An I-R service engineer will gladly call and make recommendations for maintaining the highest C. E. at all times. This includes instructions to repairmen for installing and repairing tools—setting up standard C. E. tests—checking air pressures, etc.

Send for a copy of our two-color Chipper Repair Chart, Form 5634.





September, 1945

ow und plihin tial rith a

an-

enany nal this phof ted ms, tin-

the

und

ers,

sts,

pe-

up-

ice-

om-

tric

to

ced

ny,

any

will the

for

of

ield

ff

15

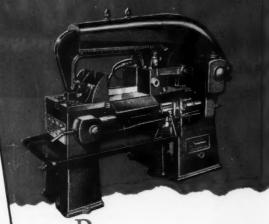


# **Progressive Feed**

the only correct metal-cutting principle

# comparison proves

- 1. Proper Design
  Based on nearly forty
  years experience in
  the art of metal
  cutting.
  - RACINE Machines
     meet accepted standards of the machine tool industry.
  - 3. Easy to handle—Single lever control of all operating functions.
    - 4. Hydraulic operation and control permits rugged construction—Economical production results.



ROPER application of the cutting tool is vitally important in sawing machines. That is why RACINE pioneered, many years ago, positive, progressive feed throughout the cutting stroke. This is still an exclusive RACINE feature.

Progressive Feed has these advantages. Undue strain is avoided. Each tooth is made to act like a parting tool. More metal is removed on each cutting stroke. That is the reason RACINE Machines cut faster and more accurately.

RACINE Hydraulic Machines incorporate a Dual (positive and flexible) Feed Control. Under positive feed the depth of cut is predetermined in every type of stock. Flexible feed enables the blade to cut faster in round stock and the lighter sections of tubing and shaped materials. Dual Feed is exclusively RACINE.

These scientifically accurate, fast cutting machines are available in four models and all capacities from 6" x 6" to 20" x 20". Write for catalog No. 12. At the same time outline the cutting work you have to do. Our engineers will recommend the best machine for the job.



RACINE "Variable Volume" Oil Pumps
A Modern Source of Hydraulic Force
RACINE Oil Hydraulic Pumps in three
capacities: 12, 20 and 30 G.P.M. provide
from zero to full capacity without relief
valves. They operate at pressures from 50
to 1000 lbs. P.S.I. Ask for catalog P-10-C.

RACINE TOOL AND MACHINE COMPANY 1754 State St. Racine, Wisconsin, U. S. A.

945

# FREEanswer your need for

# "R" MONEL

. . . for parts not to be hardened by heat treatment

Here's a specially developed grade of Monel you can use in making parts on high-speed automatic screw machines. Aside from its easy machinability, "R" MONEL provides practically the same mechanical properties and corrosion resistance that have made regular Monel so valuable. Its strength is equal to that of the best steel screw stock.

### The Working of HIGH-NICKEL ALLOYS

MACHINENS INCO NICERL ALLOYS

-5- 20017 -6- 20017

Environment and Empirel Straker

A CONTROLLED AND A CONT

# MACHINING TECHNIQUES

OLD DEAVIN ON HOT ROLLED

for both "R" and "KR" Monel are clearly and fully described in Machining Bulletin T-12. Write for your copy. Handy, too, is the reprint, "The Working of High-Nickel Alloys."

# -MACHINING MONELS

strong, tough, rust-proof screw stock

# "KR" MONEL

... for parts to be hardened by heat treatment

"K" Monel has long been known for its great strength and hardness. Now you have its *machinable* brother, "KR" MONEL, to use for screw machine parts that must be heat hardened to withstand heavy loads. Remember "KR" as your best bet for corrosion-resisting parts that must be made extra hard and strong through heat treatment.

FREE-MACHINING
"R" AND "KR" MONELS
CAN SAVE YOU
TIME AND MONEY

THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street, New, York 5, N. Y. Gentlemen: Please send me

□ a copy of Machining Bulletin <sup>T</sup>-12
 □ a copy of "The Working of High-Nickel Alloys"

a copy of "The Working of High-Nickel Allo

Company....

# News of the Industry

## Machine Affiliates Expands

Machine Affiliates, which is an affiliation of fifteen non-competitive American machine tool builders who have combined to foster the export of their products to Latin America, has invited several non-competitive machine tool builders to join this group.

Organized in the Spring of 1944, the



MELVIN STONE

group comprising Machine Affiliates includes The Acme Machine Tool Company (Turret Machinery; Turret Lathes) The Cincinnati Bickford Machine Tool Company (Radial Drilling Machines; Upright Drilling Machines; Jig Boring Machines), Cincinnati Electrical Tool Company (Bench and Pedestal Grinders and Buffers; Tool Post Grinders; Speed Lathes; Abrasive Cut-Off, Machines; Portable Electric Drills, Screw Drivers, Grinders, Nut Setters, Tappers and Routers), The Cleveland Automatic Macine Company (Automatic Chucking, Forming and Screw Machines; Automatic Die-Casting Machines).

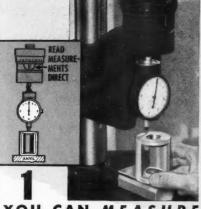
Gallmeyer & Livingston Company (Surface Grinders; Universal Cutter and Tool Grinders; Combination Drill and Tap Grinders; Tap Grinders and Drill Grinders), General Machinery Corporation-Niles Tool Works Division (Railroad Machinery; Quartering and Crankpin Turning Machines; Axle, Journal Burnishing, Car Wheel and Locomotive Driving Wheel Lathes; Extra Heavy Duty Lathes, Boring Mills, Planers and Radial Drills), Gould & Eberhardt, Inc. (Shapers; Gear Cutting Machines).

The G. A. Gray Company (All Types of Planers; Milling Planers; Planer-Type Milling Machines; Horizontal Boring Machines), The Hanchett Manufacturing Company (Surface Grinders for Flat Surfaces; Face Grinders; Rotary Surface Grinders; Disc Grinders; Vertical Spindle Reciprocating-Type Grinders; Large Plano Cylinder Wheel and Straight Wheel Type Grinders), The Henry & Wright Manufacturing Company (Sensitive Drill Presses; Dieing Machines; Automatic Punch Presses)

The King Machine Tool Company (Vertical Boring and Turning Machines), The R. K. LeBlond Machine Tool Company (Lathes of all Types; Light General Manufacturing; Light Precision; Heavy Duty; Precision Tool Room; Oil Field, Automatic and Special Lathes), Murchey Machine & Tool Company (Bolt and Pipe Threading Machines; Thread Milling Machines; Self-Opening Die Heads; Collapsible Machine and Pipe Taps; Roller Pipe-Cutting Machines; Centering Machines). Universal Boring Machine Company (Horizontal Boring Machines).

One man from each of the concerns who are members of this group—usually the Vice President in Charge of Sales—is on the Advisory Board of Machine Affiliates. Four of these men—Mr. B. N. Brockman, Vice President of the LeBlond Machine Tool Co., Mr. A. C. Wais, Vice President of General Machinery Corporation, Niles Tools Works Division, Mr. E. F. Jefferles, President of Universal Boring Machine Co., and Mr. G. E. Spies, Secretary of Gould & Eberhardt, Inc.—together with Mr. Melvin Stone, who is the President and General Manager of Machine Affiliates Inc., will constitute the manage-

# In This Modern Gage You Get



on ad e, 0ra

nraes ral 11rs 0-S; pe eel

3),

ng e-S-

ny

a-

ne

8:

ht

ool

e-

ool

a-

lf-

a-

ıt-

s),

ny

ns

u-

of

a-

1of

fr. ral

ols es,

ne

of

ith

ent

fil-

ge-945 YOU CAN MEASURE DIMENSIONS DIRECT

This Gage is ideally suited for jobbing and contract shops having a variety of relatively short-run work to inspect which necessitates frequent changes in Gage set-up. It is equally valuable for manufacturing plants and tool shops requiring a Universaltype Gage - because it is 3 Gages in 1 - a truly economical investment.



The Micrometer Head gives unusual speed in setting-up and, in addition, eliminates the necessity for a complete set of precision gage blocks for making measurements or comparisons - two 1", one 2" and one 3" block being all that are required for all settings to .0001" throughout the 8" capacity of the Gage. - Write for bulletin.

MODEL 120 B-1 MICROMETER-COMPARATOR



YOU CAN COMPARE DIMENSIONS



YOU CAN MEASURE OR COMPARE THREAD PITCH DIAMETER 3-Wire Method



FEDERAL PRODUCTS CORPORATION . 1144 Eddy St.,

BRANCH OFFICES Chicago Cleveland Detroit Indianapolis

Rochester

RECISION

REPRESENTATIVES In principal cities throughout United States and Canada.

Are You Surface Grinding with Segmen



MODERN MACHINE SHOP

September, 1945

# with segments" Norton Fitted" to your jobs?

"35% longer life than competing segments and faster, cooler cutting action." . . .

"Surfacing costs down to 19 cents per part compared to  $23\frac{1}{2}$  and 27 cents previously."

. . "Norton segments cut faster, gave 10% longer life, required less dressing."

Norton abrasive engineers are constantly making savings like these because the variety of segments that they have to choose from makes possible accurate fitting to the job. They can choose from five Norton abrasives, from four bonds, from a wide range of grains, grades and structures. • Let your Norton abrasive engineer save you money on your segment jobs.

NORTON COMPANY • WORCESTER 6, MASS.





# Built to stand strains of high-speed, heavy-feed, tough-metal, long-run operations

From Government Machine Tool Surplus Lists select the better machines to replace obsolete models you've been using on non-critical operations. Ask Bullard for information on these models by machine number.



Long life and maintained accuracy in multiple spindle mass production of all classes of castings, forgings and cut-off bar stock are assured by the extreme massiveness and rigidity built into the Bullard Type D MULT-AU-MATIC.

From the rugged base and sturdy carrier that guards alignment accuracy, up through the rigid column to the feed works that assure complete coordination of spindles, tool-carrying heads and indexing . . . this unified heavy construction is accurately controlled to meet every demand for efficient operation.

For complete details about the way the Bullard Type D MULT-AU-MATIC produces one finished piece (or two) within a few seconds of the time of the longest single boring, turning, facing, grooving or drilling operation, write today for Bulletin MAM-D. The Bullard Company, Bridgeport 2, Connecticut.

CREATES NEW METHODS TO MAKE MACHINES DO MORE

in qu

of

co

bu

up

bei

kn

sui

ga: prosta thr

Say

ment committee.

In late 1944 and early 1945 Mr. Stone spent eight and one-half months in Latin America, in the course of which he visited every capitol and chief industrial city in every country of South and Central America, the Carribean Islands, and Mexico. He concentrated upon making a survey of the immediate and postwar machine tool market, and also investigated existing representation and investigated and designated many new representatives for members of the group who sponsored the undertaking.

The offices of Machine Affiliates Incorporated are located at 149 Broadway, New York (6), N. Y.

### Smaller War Plants Corporation World Program for Exchanging Technical Information

Held under the auspices of the Smaller War Plants Corporation—a United States Government Agency—a worldwide plan for the exchange of technical information to manufacturers was inaugurated at a history-making conference held recently in Washington. Representatives of United Nations actively participated in discussion of the plan.

The program, as explained by Maury Maverick, SWPC Chairman, envisions a universal exchange of technical information for the benefit of small manufacturers. The service is intended to provide quick, effective assistance on production problems to small plants which do not have adequate research and engineering facilities.

In the United States the system has been pioneered by SWPC's Technical Advisory Service. Success of the plan in the United States brought many inquiries to SWPC from representatives of other nations and the international conference resulted.

The program, according to Mr. Maverick, is something new in international business relations. It is proposed to set up a cooperative system to help industry throughout the world, the idea being that if every nation has free access to the technical and scientific knowledge of the rest of the world, plus sufficient raw materials, and then organizes its industrial processes for full production and full employment, high standards of living can be achieved throughout the world. Mr. Maverick says "If this is done, it will greatly

minimize the possibility of war."

Any small manufacturer who is faced with technical problems—either of product development or manufacturing technique—can enlist the services of the Smaller War Plants Corporation without charge. SWPC has 110 offices in the larger cities throughout the United States, and all that is necessary is to contact the nearest office, either in person or by mail.

## Foreign Patents Now Available to American Industry

Acting under the authority of the "Trading with the Enemy Act," amended by the First War Powers Act of Dec. 18, 1941, the President established the Office of Alien Property Custodian in March, 1942. The Alien Property Custodian has the function of taking title to or controlling property in the United States which is owned or controlled by enemy nationals or, in certain cases, by non-enemy foreign nationals. Such property includes business enterprises of all kinds and sizes, real property, trusts, estates, ships, patents, copyrights, trademarks, and certain miscellaneous property.

By delegation of residential authority, the Custodian is directed to hold, use, administer, or otherwise deal with vested (i. e., seized) patents "in the interest of and for the benefit of the United States." This authority is now being exercised with respect to the patent rights of enemies and of the residents of enemy-occupied countries.

The Alien Property Custodian now controls the largest block of patents in the United States, numbering in the tens of thousands and covering inventions in every field of applied science. These patents represent millions of manhours of research and the expenditure of many millions of dollars. Included are some of the finest foreign research achievements in modern science, particularly in the production of dyestuffs plastics, pharmaceuticals, and electrical goods, also patents relating to synthetic shellac manufacture, waterproofing of cloth, quick freezing of fruit juices, improved magnetic alloys, and processes for making rayon.

Here are many patents covering processes which gave the Axis nations the ability to carry on mechanized warfare for years while cut off from sufficient supplies of basic raw materials, from

ations

all

me

ion

ion

TIC

the

rite

cut.

MORE

, 1945

petroleum, rubber, certain non-ferrous and alloy metals, sugar, cotton, and wool.

Lists of patents available can be obtained by writing to the Office of Alien Property Custodian, Chicago (3), Illinois, specifying class numbers of the classified lists of vested patents and patent applications desired. All classes are sold for 10 cents each, except patent Office Classes 23, 74, 88, 95, 123, 178, 179, 250, and 260, which are 25 cents each. Complete catalog, \$5. Applications for licenses to use vested patents should be made to the Office of Alien Property Custodian, Washington, D. C., and each application should be accompanied by a fee of \$15 for each patent.

A list of Class Numbers and directions for making applications for vested patents can be obtained from the Office of Alien Property Custodian, Chicago

(3), Illinois.

### New Safety Code to Protext X-Ray **Technicians**

A new Safety Code for industrial use of X-rays has been completed by a War Committee of the American Standards Association. Designed to protect workers in the many thousands of plants that are using X-ray to further the war effort, the Code will also form the basis for a peace-time standard to be developed after the war.

Copies of the new Code can be obtained from the American Standards Association, 70 East 45th St., New York

(17). New York.

Plan-Co. Thread Milling Cutters. A six-page circular containing complete information and specifications on thread milling cutters, high speed steel and carbide, is now being offered by the Plan-O-Mill Corp., 1511 E. 8 Mile Rd., Hazel Park, Mich. The circular is illustrated with drawings and photographs and includes tabular data on diameter, number of flutes, face widths, and hole and keyway sizes of shank and shell type cutters. Complete ordering instructions are also included in the circular, copy of which is available free upon request.



Lap holes the economical way ... use Boyar-Schultz Copper Head Laps. They are fast working; they never wear out. The only wearing part is the inexpensive replaceable copper sleeve which is adjustable to maintain the correct lapping size till worn out and a new one is substituted. Available from stock in standard sizes, 1/8" to 21/2".

BOYAR-SCHULTZ CORP.

2120 Walnut St., CHICAGO 12, ILL

Sept



Cutting all teeth simultaneously, the Michigan Shear Speed will produce semi-finished helical gears, spur gears or splines as fast as you can finish them on a Michigan shaving machine. The gear shown, a 214 inch diameter, 27 tooth helical is currently being cut in 30 seconds each.

For information on the Shear Speed Machine and Process, ask for Bulletin 1843-44



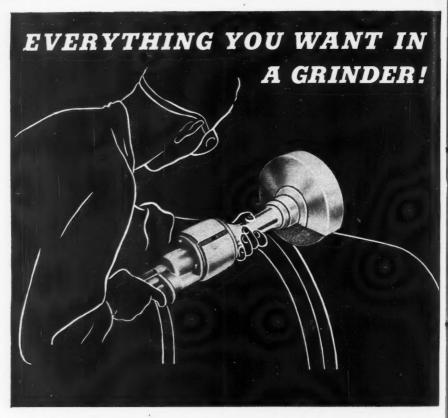
ILL

1945

# 7171 E. McNICHOLS ROAD

DETROIT 12, U.S. A.





# **CP** Pneumatic Grinders

LIGHT weight and true balance make CP Pneumatic Rotary Grinders easy to handle. Modern design and rugged construction, coupled with governor control, assure vibrationless sustained speed under load—resulting in maximum removal of metal with the minimum of wheel damage and wear.

### CHICAGO PNEUMATIC

world's largest manufacturer of pneumatic tools—supplies a complete line of CP "Power Vane" Rotary Grinders and Sanders, including General Purpose, Medium-to-Heavy-Duty, Rod, Die and Angle Grinders; Cone and Angle Sanders; Concrete Surfacers, Grinding Wheels and Wire Brushes.

大大大大大大大 PHIUMATIC TOOLS ELECTRIC TOOLS NYDRAULIC TOOLS ROCK BRILLS CHICAGO PNEUMATIC

AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

Sep



udvyone ers,

r, 1945



the blades rigidly and solidly, yet permit easy release of the blades without hammering. Fine pitch back-up screws assure accurate and uniform blade adjustment. Consequently a minimum of blade stock is lost in regrinding, a particular advantage when carbide tips are used. Specify McCrosky service-proved Jack-Lock tools for your plant,- and get all the advantages only Jack-Lock Cutters can give you.

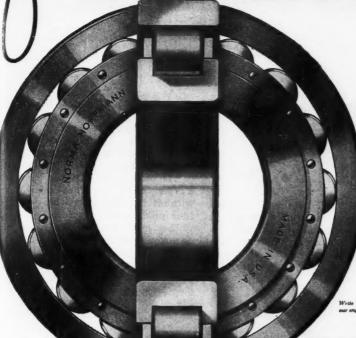
CORPORATION

Designers and Manufacturers of Block Type BORING BARS Jack-Lock MILLING CUTTERS

Wigard CHUCKS AND COLLETS Super Adjustable REAMERS

Turret TOOL POSTS

# or MAXIMUM CAPACITY IN MINIMUM SPACE



Write for the Catalog. Let our engineers work with you.

Interchangeable

<u>NVRMA-HVFFMANN</u>

PRECISION ROLLER BEARINGS

NORMA-HOFFMANN BEARINGS CORP'N.,

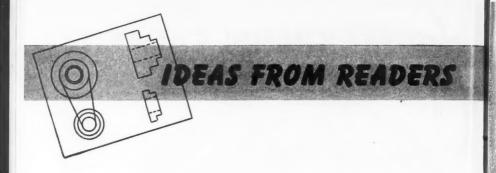
STAMFORD, CONN., U. S. A. • Founded in 1911.

BUY WAR BONDS TODAY!

Their solid cylindrical rollers provide maximum contact area, giving larger load and shock-absorbing capacity than any other single-row bearing of like dimensions. Thus, when NORMA-HOFFMANN PRECISION ROLLER BEARINGS are used in place of ball bearings, a greater factor of safety is provided, together with added life, particularly under vibration and overload PRECISION qualities in workmanship and materials adapt them alike for both low and high speeds.

1945

sts

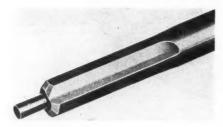


# Expanding Small Carbide-Tipped Reamers

By T. KIRK

Westinghouse Electric Corporation, East Springfield, Mass.

WHEN small-diameter reamers that have tungsten carbide tips are worn below size, they have no further value except in the rare cases when they may be reground to smaller diameters for other jobs.



By Driving a Taper Pin into the End of a Carbide-Tipped Reamer the Life of the Reamer can be Increased from 75 to 90 Per Cent

The photograph herewith illustrates a method of expanding these worn reamers so that they can be used again on the jobs for which they were originally intended, or for similar jobs.

When a reamer is worn beyond use, a small-diameter hole is drilled into

the end of the reamer, in the soft core, to a depth of about % inch. Then a slightly tapered drill rod pin is forced into the hole until the end of the reamer is expended to the required diameter. Using this method, it has been found possible to expand a reamer as much as 0.0005 inch without ill effect, and the reamer is thus made usable again.

The hole should not be drilled, however, until the reamer actually requires expanding in order to guard against any unnecessary weakening of the reamer or loosening of the carbide tips. By using this method, the life of a reamer of this type can be increased from 75 to 90 per cent.

# Hex Stock for Jig Feet

By M. W. Bossman

IT has been my observation that the majority of drill jigs are equipped with feet made from round stock in which the inevitable holes have been drilled to receive a pin with which the feet are threaded into or out of corresponding holes in the jib-base, or which have been milled flat on the sides to take a wrench.

This drilling or milling time can be saved, as well as the time usually spent in looking for the pin or DIST

ENGL

Septer



Keyways in gears, collers, couplings, milling cutters, pulley hubs or other parts—cut to standard width and any desired depth.

Simply select a bushing to fit the bore in which keyway is to be cut, then insert broach in the slot in the bushing and force through under a

press, first with cutter alone, then with shim or shims back of cutter to finish keyway to required depth.

For extra efficiency use Threadwell Keyway Cutters with a Threadwell Arbor Press . . Ask your nearest Threadwell Distributor about this dependable combination.

DISTRIBUTORS IN LEADING INDUSTRIAL CENTERS
THROUGHOUT AMERICA
EXPORT STOCKING DISTRIBUTORS

CANADA, Bridge Machinery Ca., Montreol; ENGLAND, Skylux Ed., London and John H. Graham and Co., Inc. THROUGHOUT THE WORLD Threadwell

Modern of

And Other Tops, Dies and Screw Please of

# HREADWELL

TAP AND DIE COMPANY . GREENFIELD, MASSACHUSETTS, U.S.A.

CALIFORNIA OFFICE, THREADWELL TAP & DIE CO. OF CALIF., 1322 SANTA FE AVE., LOS ANGELES 21

September, 1945

uard

ning

car-

the

1 be

the

ped in een

iich

of

on can

ally

or

945



From hardwood-handle to tempered-steel blade, every "Yankee spiral screw driver is right to the point. Every part is ingeniously designed to speed work, cut down man-hours. Painstaking design and simple strength are typical of all "Yankee" fine mechanics' tools . . . whether Tap Wrenches, Vises, Automatic Drills, or Bit Braces. For more than fifty years, "Yankee" reputation for fast performance and reliability has grown steadily, is growing today, as "Yankee" tools help speed war production.

Order from your industrial supply distributor, or write North Bros. Mfg. Co., Dept. MMS-945. Phila., Pa.

"YANKEE" SPIRAL SCREW DRIVER No. 130A A Size for Every Purpose

# YANKEE"TOOLS

make good mechanics better North Bros. Mfg. Co., Phila. 33, U. S. A. Established 1880

wrench, by making these feet of hex stock. The saving in time will more than offset the difference in cost between the round and the hex stock.

# Headstock Spindle for **Turning Bolts**

(Courtesy General Electric Company)

O simplify the task of turning large bolts of the body-bound type, a special headstock spindle has been designed and developed at General Electric's Pittsfield Works.

The feature of the new spindle is



Special Headstock Spindle for Turning Bolts, Developed at General Electric's Pittsfield Works

an over-size section which projects past the headstock center and which is counterbored to take the head of the bolt. Holes are drilled and tapped in opposite sides of the wall of the recess to take two %-inch 16-thread setscrews which are threaded in far enough to serve as dogs to drive the bolt. Inasmuch as it is necessary to center both ends of the bolt for grinding purposes, there is additional expense for the centering operation.

The new method eliminates the conventional slow method of chuckEL

FC

Th

ma

inc sin

us

dis

OR The

WI

for

PA



### FOR CUTTING COSTS NOW, FOR MACHINE FLEXIBILITY DURING RECONVERSION PERIOD

Their compact size, lowest overall height, ability to work in close quarters, and wide range of capacity, permit WESSON Angle Vises to multiply the uses of many standard machine tools without resorting to special angle fixtures. In toolroom or production work WESSON Vises slash set-up time and cut costs . . . earn back their price many times over!

The 3-Way Universal feature of WESSON Angle Vises eliminates the need of many costly fixtures for holding angle work. This is a mighty important advantage in avoiding "toolroom blockades" and difficulties in designing and producing individual angle fixtures. Speedy precision compound angle set-ups are made simple . . . in toolroom or production work, where a series of these vises often are used with fixed set-ups, since each vise may be removed from any machine without disturbing the set-up or the workpiece.

ORDER NOW FOR IMMEDIATE DELIVERY!
These versatile, top quality, high precision
WESSON 3-Way Angle Vises are available now
use the most efficient multiple adaptations
for present or postwar production. BE PREPARED . . . BUY NOW!



WESSON PRODUCTS CO	" pehr. min-,	DUALITY	200
709 Fisher Bldg., Detro	it 2, Michigan		
Please send me illustrate	ed bulletin of WESSON Universal VISI	S and ANGLE PLA	ATES
Name and Title			*******
Firm Name		*************************	*******
		( )	54

September, 1945

hex ore beock.

und

has en-

e is

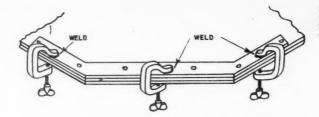
Bolts,

ects

hich d of oped

the read far the y to for onal tion. the uck-

eld



By Welding the Clamps to the Templet, as Shown in the Drawing, the Templets and Clamp Can be Handled as a Single Piece

ing the bolts for turning, reducing handling time by 50 per cent and inincreasing production substantially.

# Welding C-Clamps to Templet Saves Time

By L. KASPER

THEN a templet or jig is used for drilling large sheets or similar bulky parts, several of which are clamped together with the templet clamped on top as shown in the illustration, considerable time may be saved by welding the clamps to the templet, as illustrated, so that all of the clamps and the templet may be handled as one piece.

In the process of welding the feet of the clamps to the templet, if the sides of the clamp-frames are held in contact with the edge of the templet, they can be used as stops or locating points for quick alignment of the parts in the templet.

RECONVERSION TO CIVILIAN PRODUCTS WILL ALSO REQUIRE MANY SMALL SHARP DRILLS. KEEP SMALL DRILLS SHARP WITH



# BLACK DIAMOND DRILL GRINDERS

FOR SMALL GAUGE AND FRACTIONAL DRILLS You can save valuable time and skilled labor by using a Black Diamond Grinder for sharpening of all small gauge and fractional drills. Simple instruction makes the most unskilled operator an expert on producing quantities of perfectly sharpened drills with lips of uniform length, correct angle and clearance.

To speed production and save expensive drill stock to reduce drill breakage and release skilled labor for mere important work, install a Black Diamond Drill Grinder at once.

The Diamond Dresser keeps the grinding wheel sharp cutting and the Web Thinning Attachment efficiently cares for the grinding of Notched, Colton

or Crank shaft points. You can't equal a Black Diamond. Write at once for complete details.

DIAMOND SAW & MACHINE WORKS, 45 NORTH AVENUE NATICK, MASSACHUSETTS Hex

COM

thre

thate



olet llube the of be eet the reld em-10of

NY

D

ILLS rodr arp-

illed lo as

form

stock

Black rheel ment olton Black

NC.

ETTS

PAINT SPRAYING EQUIPMENT, AIR COMPRESSORS, SPRAY GUNS, PUMPS, AIR TOOLS, INSECTICIDE

THROUGH LEADING JOBBERS
IN PRINCIPAL CITIES

VALVES, PUMPS, HYDRAULIC CYLINDERS AND CONTROLS FOR AIRCRAFT, AUTOMOTIVE AND OTHER INDUSTRIAL APPLICATIONS



Here are two fine lines that production will be resumed on just as fast as conditions permit. Electric Sprayit Company products will be distributed through a select group of Jobbers in most principal distribution points throughout the country. If you do not know the name of the Jobber nearest you . . . write us today and we'll send this to you immediately.



SHEBOYGAN, WISCONSIN



1945 September, 1945

MODERN MACHINE SHOP

233

# AMIC

# PRECISION VERNIER GAGES

AMIC PRECISION VERNIER CALIPERS

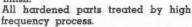
6" 10" 12" 24"
Range or
150mm 250mm
300mm 600mm
available from stock
or on short delivery.

### AMIC PRECISION VERNIER HEIGHT GAGES

10" 18" 24"
Range or
250mm 460mm
available from stock.
Long "Open-Win-

dow-Type" slider out of one solid piece of toolsteel. No rivets, no cross members.

Base and Slider of He ight Gages rustproofed by attractive deep penetration — Black Magic



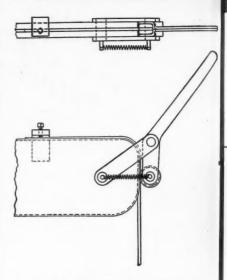
ASK FOR LITERATURE AND PRICES.

AMERICAN MEASURING INSTRUMENTS CORP. 240 WEST 40th STREET NEW YORK 18, N. Y.

# A Bending Fixture For Irregular Shapes

By L. KASPER

THE conventional type of bending fixture is capable of forming regular curves, but cannot follow irregular outlines, as the movement of the forming roll is restricted to a circular path. The drawing illustrates a



Steel

parts assemi

Big tir

Shon

or lan

seats.

Drawing of Bending Fixture Designed to Produce Irregular Contours

modification which adds considerably to the versatility of such a fixture without detracting from its usefulness in forming regular curves.

As will be seen in the drawing, the modification consists merely in adding the bell crank lever which forms the handle, so that the roll may follow the irregular path of the forming plate. The spring is provided to prevent the bell crank lever from swiveling freely on its stud during the return movement.



r

ling regregthe rcus a

style or size, built for long life and hard service.

Shop Stools with steel, solid wood or laminated wood seats. Sturdy reinforced legs, of any desired height.

d

ably

ture eful-

the

ad-

rms

fol-

ning prewive re-

1945



Where small, loose products are used or produced, per-fecting the materials handling system is often the most important factor in attaining lower production cost. An essential part of the system is properly designed, light and strong metal shop containers for the pickup, collection, and conveyance of materials to and from machines, finishing, etc.

Cleveland shop containers are usually custom-made, because the small extra first cost is trifling compared with the advantages gained by having containers built to fit individual needs. Catalog, prices, and design service on request.

SHOP EQUIPMENT DIVISION

Cleveland Wire Spring Co. 5250 BROOKPARK RD. . CLEVELAND 9, OHIO

# **TOOLS FOR EVERY INDUSTRY**

MOTORS SHIP BUILDING









THIS 72 PAGE CASE BOUND CATALOG SHOWS PICTURES. SIZES, PRICES. SPEEDS, etc. OF ALL **OUR PRODUCTS** 

noid

air a ton

C. B

dout phra

and p

or oi poun

MILLING CUTTERS FORM RELIEVED CUTTERS

YOURS FOR THE ASKING

DETROIT 5, MICH.

DETAILS AND DELIVERY FOR GIVE YOU QUICK ACTION!

MODERN MACHINE SHOP

236

September, 1945 Septem



GE VD

,

etc.

CTS

RS THE NG

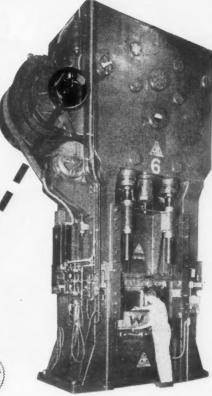
1945

This 300-ton press in service at Boeing Aircraft Co., is a product of Clearing Machine Corporation, Chicago, Illinois,

# 300 TON PRESS CONTROLLED BY QUICK-AS-WINK

A 1" No. CL1690-S3 Quick-As-Wink solenoid operated 3-way air valve controls an air actuated clutch and brake on this 300ton double action press.

C. B. Hunt & Son manufactures single and double solenoid valves; hand, foot, and laphragm operated valves for air; also hand and pilot operated hydraulic types for water or oil applications up to pressures of 5,000 pounds, in standard and special ages.







C. B. HUNT & SON

1836 E. Pershing St.

SALEM, OHIO

Write for the engineering-styled, easy-to-use Quick-As-Wink catalog. Complete data you can use for your specification work.

# MIGHTY but Gentle!



T'S A HARD HITTING "SOFTIE"-Nupla Hammer uses a new semisoft, flexile plastic that HEALS ITSELF when dented or deformed. Hits hard blows without damage to delicate parts or finishes. Non-inflammable! Not affected by oil or gasoline! A new tool every craftsman wants and needs. 3 sizes and 7 weights.

SOLD AT HARDWARE STORES EVERYWHERE. Write for name of local dealer.

NEW PLASTIC CORPORATION ● 1017 No. Sycamore Ave., Los Angeles 38, Calif.

MIGHTY
but Gentle

NUPLA
PLASTIC
HAMMERS

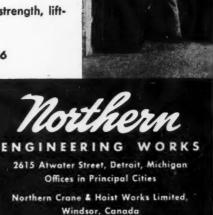
# WITH **Northern**HIGH-LIFT LOW HEADROOM ELECTRIC HOISTS

LOOK WHERE THE HOOK GOE

The high hook lift-low headroom feature of Northern Electric Hoists will add 12" to 36" to the working height of your building—without extra expense—without altering the building. This means better use of storage space, easier handling of bulky loads, faster operation because clearances are greater.

Northern Hoists are also superior in strength, lifting power, speed, and handling.

Write for Booklet No. 26



945

# NEW SHOP EQUIPMENT

### LeMaire Special Purpose High-Production Machine

Combining several standard units on one fabricated base, a special purpose high-production machine for drilling, reaming, and tapping threading dies ranging in diameters from 1/4 to 11/2 inches has been developed by the LeMaire Tool and Manufacturing Co., Dearborn, Mich. A standard LeMaire twin ram No. 5,000 hydraulic unit is used for the drilling operation; a standard No. 2,000 unit supplies the power for the reaming operation, with a standard lead screw tapping unit completing the cycle. Positioned around a 24-inch index table, all three units are mounted on a T-shaped fabricated base.

Maximum accuracy is said to be obtained since the drilling, reaming, and tapping operations are all performed without removing the part from the fixture. A master collet and inserts make possible the accommodation of many sizes of dies, and change-over from one size die to another can be readily ac-

complished since speeds are infinitely controlled by a hand knob and feeds by a flow valve. In order to maintain a constant cutting speed, all units are controlled by variable speed motors. A forward push on a gear lever provides for clamping of the part in position and a pull on the lever enables the part to be unclamped and ejected when the table returns to unloading position.

table returns to unloading position.

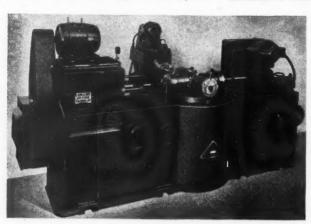
After loading the work in the machine, it is first drilled, then reamed, and finally tapped. Production on an average size die of % inches is said to be approximately 83 pieces per hour. A multiple head can be readily applied to the machine to make it suitable for drilling, reaming, and tapping a number of holes in a part at one setting.

## "Red Ring" Roto Shaver

A machine primarily designed for finishing the back faces and bores of automotive rear axle ring gears, to be

known as the "Red Ring" Roto Shaver, has been announced by the National Broach and Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. The machine can also be used to finish pressure plates, internal ring gears, and other parts. Cutter heads for a variety of special applications can be provided.

Roto Shaving is described as a rapid,



LeMaire Special Purpose High-Production Machine

Septe



September, 1945

n a

maned.

for um-

finof be Red ver. ced al

ine

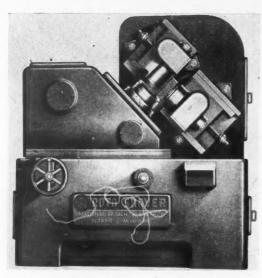
ean ich. lso esnal

her ads pe-

can deoid,

ose

945



loading and unloading. The design of the cutters is such that they may be sharpened on any standard cutter grinder. The heads on which the cutters are located can be adjusted to any angle.

The machine is constructed to handle ring gears having bores from 4½ to 9 inches and outside diameters up to 15% inches. Hydraulic power is used to clamp the work and to traverse the work slide. The feed is controlled by a cam. A 1 h. p. motor drives the work part and a 1 h.p. motor drives each cutter. Both drives are effected through V-belts. Sheaves allow for changes in speeds.

close tolerance green finishing operation for circular, flanged, cylindrical, and conical parts. It is said to be especially useful in the finishing of those surfaces for subsequent machining operations.

The complete cutting cycle on large truck ring gears, both back face and bore, is approximately 15 to 20 seconds. According to the manufacturer, approximately 3,000 to 4,000 parts can be Roto Shaved before the cutters need regrinding on the basis of removing up to 0.015 inch of stock from the back face and 0.020 inch from the diameter of the bore. Both the back face and bore are shaved simultaneously to tolerances required for accurate gear generating.

The Red Ring Roto Shaver is especially constructed for easy and rapid

# Nichols Double Spindle Milling Machine

A S

on a

liqui

two

an h

of p

minu

Th

enou

filter

sludg

vents empt turnir

mach

Septem

Designed so that two cuts can be made simultaneously, a double spindle milling machine for light production work requiring medium duty cuts in metals and plastics is announced by W. H. Nichols & Sons, 48 Woerd, Waltham 54, Mass. The unit illustrated is provided with two opposed spindles having No. 40 milling machine tapers. Adjustments are provided on this model so that the spindles may be lined up or set out of line vertically 2½ inches, horizontally 2½ inches, and in or out 1½ inches.

Another model can be supplied with two identical spindles, one directly over



# A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought a more accurate and surprisingly faster way of transferring blind screw holes.

S v

The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in #\* to 1" diameters. Send to price list.

HEIMANN MFG. CO.

330 Lincoln Ave.

Urbana, Ohio



de-

that

The

are

anv

cted

ving

and

is

d to

The

n. A vork ives

e efaves

ng

be

ndle

tion in

W.

ham

pro-

ving

ust-

e set

nori-

11/2

with

over

y -

a o e t.

1945

Pick-up position: Suction hose on intake atswivel connection—
Two way valve open—slide valve in—three way valve open to atmosphere.

Discharge position:
Pressure in tank—
hose on drain valve
— two way valve
closed — slide valve
out closing intake to
vacuum producer and
opening ports to allow air to be drawn
into vacuum producer
from outside — three
way valve closed delivering air into tank
under pressure.



# The Spencer SUMP-VAC Cleans Sumps in 2 to 10 Minutes

A Spencer vacuum producer mounted on a closed tank on wheels removes all liquid and sludge from sump tanks in two to ten minutes compared with half an hour with former methods. The rate of pick up is 40 gallons of liquid per minute.

The tank capacity is 125 gallons or enough for 3 to 5 average sumps. A filter basket collects chips and heavy sludge. A Neoprene float valve prevents overfilling of the machine. It is emptied by gravity in two minutes. By turning the valves provided with the machine and connecting the hose to the

drain valve, liquid can be discharged under approximately 3 lbs. pressure. This permits raising the liquid to a height of 6 ft., emptying the tank into a drum or other container for easy disposal.

No priming is necessary — and all material in the sump tank is cleaned out by air vacuum after the liquid is removed.

Sizes 3/4 or 11/2 horsepower, universal or single phase motors, 25 to 60 cycles, 110 or 220 volts or d.c.; 121/2 foot vacuum hose lengths and 50 foot cable extension. Ask for the bulletin.

# SPENCER VACUUM CLEANING HE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

September, 1945

MODERN MACHINE SHOP

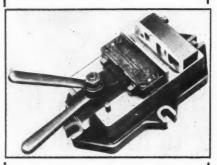
243

# -HARTFORD-

4 POINT MILLING VISE

the other. A vertical adjustment is provided so that the center line of the spindles may be positioned from  $4\frac{1}{2}$  inches minimum to  $7\frac{1}{2}$  inches maximum. Both models are available with a choice of spindle drives and are regularly furnished with two motors, one for each spindle, so that independent selection of spindle rotation is obtained. An optional drive includes a single motor that turns both spindles in the same direction.

The Nichols Miller is constructed with



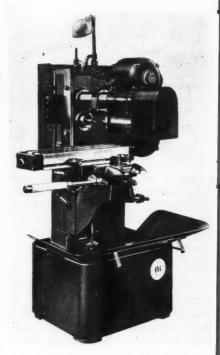
• ACCURACY • SPEED
• POWER • STRENGTH

This HARTFORD Milling Vise is very powerful and can be operated by a single hand. A cam handle for rapid closing and opening in combination with an eccentric handle for locking offers ease in operation.

HARTFORD Milling Vises are famous for their power, speed, accuracy and strength.

Write for complete details.

THE HARTFORD
SPECIAL MACHINERY CO.
HARTFORD 5, CONN.



Nichols Double Spindle Milling Machine

heavy alloy spindles which are mounted in permanently lubricated ball bearings. Spindle noses are hardened and ground. The work table is cast of special wear-resistant alloy, with the top ground to assure accurate location of standard work holders or special fixtures for semi-automatic production. The table can be operated by either a screw or rack and pinion and is fitted with graduated stops. All slides are pressure gun lubricated so that old oil is

# FOR 101 METAL CUTTING JOBS . . .

Sauce

The No. 8 showing new Wells Wet Cutting System—an economical accessory available for all No. 8 Wells Saws.

With a Wells No. 8 in your shop you save time in these ways: First—there's little set-up time. Your Wells is always ready for any shape, size or type metal you clamp into its quick-acting vise. Then—

because the Wells has gravity-feed and an automatic shut-off, one man can operate two or more Wells saws simultaneously. The new Wells-designed Wet Cutting System provides all the time-saving advantages of wet cutting. It's an economical accessory for production sawing. Then too—because a Wells is easily portable, you can save time and labor by moving the saw to the work. Find out for yourself. Write for details.

# Specifications

CAPACITY	: Re	00	tan	gu	lar												8"	×	16"	
ROUNDS:															. 1	B"	Die	am	eter	
MOTOR:													1/	2	H.P.,	A.	C.	or	D.C.	
SPEEDS:						Se	ele	cti	ve	60,	9	0,	130	5	feet	pe	er	mi	nute	
WEIGHT.				_							m	nre	vin	30	tely	75	0	200	ınds	



Products by Wells are Practical

# METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION 808 TYLER STREET, THREE RIVERS, MICH.

eptember, 1945

MODERN MACHINE SHOP

245

hine

pro-

pinches Both of dish-

pinof

onal urns with

bearl and
spece top
on of
l fixaction.

fitted s are l oil is

r, 1945

flushed out automatically each time the gun is used. A removable coolant tank is located in the base of the machine.

## Progressive Duplex Seam Welder

A duplex seam welder designed for the simultaneous seam welding of two or more parallel seams on one surface has been announced by the Progessive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich. Available in a wide range of capacities and sizes, the ma-



### DRILL and PILOT BUSHINGS Frictionless -Rotary

For core drilling, T. C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch. Write for details.

GIERN & ANHOLTT TOOL CO. 1312 Mt. Elliott Ave. Detroit, Mich.

# HAMILTON HOBBERS



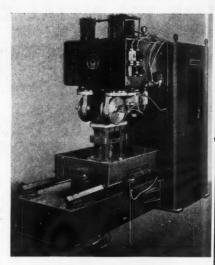
... for accuracy and speed in hobbing PINIONS, GEARS and SECTORS. TWO MODELS

No. 00 SPUR GEAR HOBBER for work up to 2" dia. No. 1 SPUR and SPIRAL GEAR HOB-BER (illustrated) for work up to 6'

Write for further details to

**Hanufactured** by THE HAMILTON TOOL CO. Hamilton, Ohio

TRIPLEX MACHINE TOOL CORP. Sales Agents 125 Barclay St., New York 7, N. Y.



Progressive Duplex Seam Welder

chine is air operated and fully automatic. The duplex head of the machine is designed to accommodate either two or four welding wheels. shown in the accompanying illustration is provided with two seam welding wheels on each of the two welding heads. The outer wheels are of larger diameter to provide clearance for the inner wheels while the outside wheels are used for welding. All wheels are free rotating and are driven by contact with the moving work under welding pressure.

The work itself is located on a work table mounted on horizontal slide rails. The top of the work holding fixture is formed by a flat copper plate which provides the lower path for the welding





auto-

chine

r two

model ration

elding

elding larger

r the

vheels

s are ontact elding work rails. ure is which elding

LURES

MENT Sizes LOG.

G. CO

current between the welding wheels. Thus, the platen top becomes the lower electrode for both wheels. Welding wheels, lower electrode, welding transformer, and so on, are all water cooled.

The entire assembly bearing the work to be welded is moved in and out of the machine as the welding operation proceeds. Operation of the movable table is afforded by an air cylinder connected with hydraulic cylinders acting as dash pots to ensure uniformly smooth table The speed of the work table. and therefore the feed of the work. is steplessly adjustable from 0 to 30 inches per minute at usual factory air line pressures. Limit switches engage dogs on the work table to automatically control the table travel, fixture indexing, and start of the welding cycle on both the "in" and the "out" strokes.

The operation of the Progressive Duplex Seam Welder is completely auto-The operator loads the rotary fixture and depresses a foot switch. The table moves forward into the machine: the welding heads depress simultaneously at the proper point; and the outside pair of welding wheels makes two parallel seam welds of predetermined length. The head rises while the rotary table indexes, rotating through 90 degrees, and the inside wheels then weld on the "out" stroke of the table. Thus. two separate pairs of seam welds, each pair at right angles to the other, may The fixture indexes a be produced. second time (back through 90 degrees) at the completion of the "out" stroke and the table stops at the loading position.

The Progressive Duplex Seam Welder is available with transformer capacities up to 500 kva to meet user requirements; a wide range of work table sizes and travels; and many combinations of welding wheel diameters and spacings. Conventional timing and sequence controls are used. The stroke of the head is adjustable. The overall height of the machine is 87 inches, and the unit requires a 90x51-inch floor space.

### Battelle Electrical Micrometer

An unusual type of electrical micromfor measuring movements changes in position as small as onetenth of a millionth of an inch has been developed by the Battelle Institute, Columbus 1, Ohio. The instrument, it is claimed, is designed to measure rapid

COMPACT DESIGN %

HIGH TOROUE

HIGH-RATIO LEVERS

POSITIVE NEUTRAL

PRECISION BUILT LONG WEAR LIFE

EASY ADJUSTMENT

\* These compact. powerful, multipledisc clutches are helping product engineers to reduce size and weight at the vital link between the driving and driven units of

machine tools, lift trucks, overhead cranes and a wide variety of other production equipment. They readily fit into product designs, accommodating great torque capacity within small size. Precision grinding insures perfect fit on the clutch shaft. Symmetrical contours avoid drag that is caused by centrifugal force.

### SEND FOR THIS BULLETIN ON POWER TRANSMISSION

It shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique

applications. Furnishes capacity tables. dimensions and complete specifications Every production engineer will find help in this handy bulletin, when planning postwar products.



### ROCKFORD CLUTCH DIVISION [Formerly Known as Drilling Machine]

**Borg-Warner Corporation** 300 Catherine Street Rockford, III









Reduce

# PRODUCTION COSTS with RED RING NALOY BROACHES

The service requirements of a broach are unlike those of other metal cutting tools. The broach must withstand either tensile or bending stress in addition to shear and severe abrasion, often under critical dimensional restrictions. Consequently its design and the material from which it is made are both extremely important elements in its operation.

Broach engineering technique is not available from a hand book it takes years of experience. Nor can the best results be obtained when broaches are manufactured by the methods used for other cutting tools.

After extensive research Red Ring engineers developed the Naloy treatment which has proved its marked superiority.

A Naloy treated broach is very hard without being brittle; is very tough and has exceptional resistance to abrasion. It has produced 50% and more parts per grind than its nearest competitor. The Naloy treatment is obtainable only in Red Ring Broaches. Red Ring engineers are specialists on involute form broaches.

RED RING
PRODUCTS

NATIONAL BROACH AND MACHINE CO. 5600 St. JEAN • DETROIT 13, MICH. Specialists in Laur and Medical Involute Geor Practice Originators of Rotary Shaving and Blistold Tools Laures

weld hus. each may s a ees) roke ding elder ities uiresizes s of ings. conhead the re-

romor one-

has itute, it is rapid

ETIN

tables,

cations

nd help

anning

RE

ES

SION

chine]

r, 1945

, 111



Battelle Electric Micrometer being used to measure the precision of lathe spindles

changes in position only one-thousandth as large as the thickness of the printing ink on a newspaper or about one fifty-thousandth the thickness of newsprint. It is said to be so sensitive that it can record changes considerably smaller than the wave length of light, which is the standard used in calibrating the instrument.

The Battelle Electrical Micrometer

utilizes the principle of "static free" frequency modulation (FM) radio to measure the position of slowly or rapidly moving objects without touching the object being measured. The instrument has been employed to measure the errors in high precision lathe spindles used in machining aircraft motor parts. It has also been employed as the heart of an apparament.

0

bro

abl

bee

pro

plan

Proc

as the heart of an appatus used for measuring and recording the changes in crystal structure when steel is heated rapidly, as in electric welding. Other possible uses of the micrometer include that of a "power-meter" to indicate the power output of airplane engines in flight and its use as an instrument to measure the qualities of roughness and hardness of metallic surfaces.

A. 1. S. 1. HY-TEN

N. E.

#### ALLOY STEELS FOR VICTORY

Scientifically selected to conserve critical alloys and meet the requirements of the AIRCRAFT, ORDNANCE, and MACHINE TOOL industries.

Complete "EARMARKED" stocks of Aircraft alloy steels at Buffalo and Detroit.

## WHEELOCK, LOVEJOY & CO., INC.

138 Sidney Street, Cambridge 39, Mass.

Cleveland 14, Chicago 23, Newark 5, Detroit 3, Buffalo 10, Cincinnati 32

"it's uses are almost unlimited..."



r bepre-

ncy

radio

on of oving ching ured. been

the

maarts. loyed

apparding

cture

s in

uses

of a

and

e the

ss of

says MIDWEST MACHINE PLANT
(name on request)

ORIGINALLY engineered to remove and extract broken and embedded taps and tools from valuable work pieces, hundreds of new uses have been found for THOMAS Metal Disintegrators in die and tool rooms, salvage departments and on production lines in all types of metal working plants. In "Metal Disintegration by the Thomas Process" you will discover new ways to save money, materials and man-hours in your own plant. There's a copy reserved for you...send for it!



METAL DISINTEGRATION
THOMAS PROCESS
THOMAS PROCESS

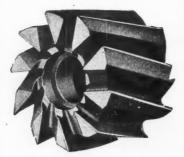
Mail in
Coupon
for this
Treatise
on
Metal
Disintegration

Û	lii	nt	01	n
MACH	INE	COI	MPA	NY
CLIN	ITON.	MICI	HIGAI	J

CLINTON MACHINE COMPANY

ADDRESS......STATE.....

# ALVORD-POLK CUTTING TOOLS



# REAMERS MILLING CUTTERS END MILLS

Standards from stock.

Attractive deliveries on a wide variety of Specials.

Write for Catalog.

ALVORD-POLK TOOL CO.

MILLERSBURG

PA

#### Michigan Model No. 1130 "Sine-Line" Gear Tooth Spacing Checker

Designated as the Model No. 1130, a simple, precision gear checker specifically designed for the rapid, accurate checking of tooth spacing on gears has been added to its "Sine-Line" checking equipment by the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. The machine is constructed to check the base pitch and tooth spacing along the



Michigan Model No. 1130 "Sine-Line" Gear Tooth Spacing Checker

line of action on spur or helical gears. Spacing can also be checked on worm gears. Gears up to 12 inches O.D. and having a maximum shaft length of 18 inches may be checked.

The principle of operation of the Model No. 1130 is based on the fact that the distance between the two corresponding sides of adjacent teeth along the line of action is equal to the distance between corresponding sides of adjacent teeth measured on the gear's base pitch circle. The machine measures along the line of action, thus indi-

Sep

inecker 30, a ficalurate

has eking Co., Mich. k the g the

Gear

gears. worm and. of 18

f the t that es of gear's

r, 1945

correalong e dis-

measindi-

PHOTO BY COURTESY OF CURTISS-WRIGHT CORP.

Shown above is an economical and practical spot-welding holding fixture, made of Hi-Den Compreg . . . a comparable unit in steel would weigh approximately forty pounds, and in aluminum would weigh approximately ten pounds, and in Hi-Den weighs only 5 lbs., 5 ounces. This holding fixture is now in continuous use by Curtiss-Wright . . . almost two feet across, this fixture weighs but five pounds, five ounces. Light Weight . . . Dimensionally Stable . . . High in Strength Values . . . Non-Corrosive . . . Non-Scratching . . . Easily Worked . . . Low in Cost and Upkeep.



Eminently suitable for many types of tool jigs and fixtures, spinning chucks, pulleys, forming blocks, dolley wheels, etc.

> Our engineering service will recommend the proper Hi-Den modifications for your use . . . just send for free sample and literature.



## PARKWOOD CORPORATION

WAKEFIELD, MASS. cating whether the spacing is correct both along the line of action and along the base pitch circle of the gear.

When setting up a gear for checking on the Model No. 1130, the fixed contact point and the indicator contact point are set tangent to the base circle on the same sides of adjacent teeth. When so set, they will measure along the line of action. A spring actuated finger maintains a constant pressure to ensure consistent accuracy of the checker.

The gear to be checked is mounted between centers on the spacing checker. Both the headstock and tailstock of the machine are movable so that the gear may be lined up readily with the contact point fingers. Errors in spacing are shown directly on an indicator graduated in ten-thousandths of an inch. An indexing pawl operated through a single action lever at the left of the machine provides for quick and automatic indexing of the gear.

matic indexing of the gear
Gears having the same pitch and base pitch may be checked without changing the setup of the machine. Helical gears are checked in the transverse plane. The normal plane may be checked by swiveling the indicator barrel to the

correct helix angle.

The Model No. 1130 is designed so that the Michigan Ay-1 recorder can be used with it when a chart record of the spacing of each tooth and also of the total variations in tooth spacing are desired. A handwheel-operated rack and pinion permits the indicator table to be quickly adjusted to line up the contact points tangent to the base circle. Gage blocks allow for accurate adjustment of the contact points. Adjustments are also provided to limit the retraction of the table when indexing from tooth to tooth.

The headstock and tailstock centers are hardened and ground, and the headstock and tailstock ways are precision scraped. A cabinet for housing arbors, indicators, and so on, is built into the base of the machine, which has an overall height of 50½ inches, height to centers of 42½ inches, and requires a floor

space of 24x331/4 inches.

#### Ideal Electric Marker

Featuring a 30 per cent more powerful cutting stroke than previously announced models, the Ideal Ellectric Marker illustrated herewith, product of





STRONG, CARLISLE & HAMMOND CO. · Cleveland 13, O.



Since 1919 The Continental Tool Works (a division of Ex-Cell-O Corporation) has been producing special and semi-standard cutting tools to customers' drawings or part prints—until today the Continental name in the cutting tool field is commonly used as another word for "accuracy and

quality." This long experience, coupled with the most modern and complete facilities, nucles Continental the first choice as a cutting tool source. Find out now how Continental can help assure you of high production efficiency—get in touch with your nearest Ex-Cell-O representative or write direct.

#### **CONTINENTAL TOOL WORKS**

DIVISION OF EX-CELL-O CORPORATION

DETROIT 6. MICHIGAN

EX-CELL-O macked Special Multiple Way-Type Precision Boring Machines • Special Multiple Precision Drilling Machines • Precision Thread Grinding, Boring and Lapping Machines Broaches and Broach Sharpening Machines • Hydraulic Power Units • Grinding Spindles • Drill Jig Bushings • Continental Cutting Tools • Tool Grinders • Fuel Injection Equipment • R. R. Pins and Bushings • Pure-Pak Paper Milk Bottle Machines • Aircraft and Miscellaneous Production Parts

d so

d of of are rack table the base irate Addimit

nters leadision

the overcenfloor

powously etric et of

s?

1945



Ideal Electric Marker in Use

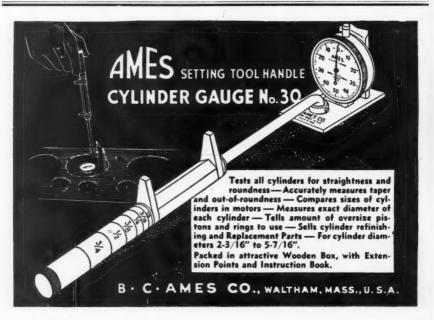
the Ideal Commutator Dresser Co., 1031 Park Ave., Sycamore, Ill., can be used in marking iron, steel, bronze, aluminum, ceramics, lead, plastics, and other materials. Shaped to fit the hand, the tool, it is claimed, can be held and used almost as easily as a pencil. The cutting stroke can be adjusted so as to

allow for the marking of even the most delicate materials.

Measuring 6 inches in length and weighing 10 oz., the Ideal Electric Marker can be operated from practically any a.c. outlet. Functioning like a small electric hammer, the tool makes 7,200 cutting strokes per minute, producing lines on surfaces that cannot be wiped away or readily worn off with ordinary usage. For average marking, a hardened alloy point is furnished with the tool as standard equipment. Where extra hard materials from 54 to 64 Rockwell Scale C are to be marked, a diamond point is recommended.

#### Universal Redesigned Drill Press Turret Head

Completely redesigned so as to provide for maximum rigidity and continuously accurate service, the drill press turret head now being marketed by the Universal Engineering Co., San Diego, Calif., incorporates semi-automatic single-action indexing of the quadrant. Automatic engagement or release of the clutch mechanism is con-



ANNEALING ALUMINUM ALLOYS AT PAN AMERICAN



Trans-Atlantic Clipper (built by Boeing) beached for servicing, La Guardia Field Hangars.

Pan American World Airways, at Marine Terminal—La Guardia Field, use, in almost constant service, a Hevi Duty 153012 Box Furnace to anneal aluminum alloy hull and wing pieces as well as miscellaneous steel assembly parts at temperatures ranging from 1000° to 1850° Fahrenheit. Flexibility of use of this furnace for many operations with accurate temperature control and heat distribution contributes largely to speedy round the clock servicing routine.

Send for Hevi Duty Box Furnace Bulletin HD-441

HEVI DUTY ELECTRIC COMPANY

HEAT THEATHER PURMACES HE HERETTY ELECTRIC EXCLUSIVELY

1945

ost

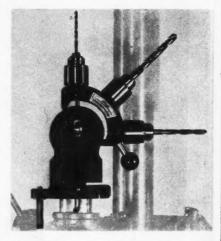
nd

a kes robe ith ng, ith ere 64

SS

orocondrill eted San utothe or With the drill press in the raised position, the operator need only shift the quadrant lever on the turret in order to select the proper tool for the next operation whether it be drilling, reaming, countersinking, counterboring, spot-facing, burring, and so on. Only the driven spindle (the one in use at the time) is in motion. The other spindles remain idle.

All parts of the Universal Redesigned



Universal Redesigned Drill Press Turret Head

Turret Head are interchangeable and precision made. The turret is produced in sizes to fit any standard drill press whether equipped with Morse taper or Jacobs chuck spindles. The turret it self includes Jacobs chucks as standard equipment.

According to the manufacturer, the Universal Redesigned Drill Press Turret Head can be easily installed by the same method as that used for tapping heads and similar drill press attachments. With the head installed, the normal stroke of the drill press is said to be reduced but ½ inch.







The Hjorth Bench Lathe has the speed, accuracy, handling ease, and dependability that appeals to every operator. That's why you'll find the better shops equipping with the Hjorth Lathe.

WRITE TODAY FOR DATA AND PRICES.

12 BEACON ST., WOBURN, MASS.

258

HJORTH LATHE & TOOL CO.

DRILLING JOB SET-UPS WITH Simplify STANDARD RAPID CLAMPING DRILL JIGS SPRING OR RACK-AND-PINION TYPES—SQUARE OR OVAL TOP PLATES-11 STANDARD SIZES Manufacturers of SIEWEK Fixture Clamps and Fittings One Siewek Jig-with simple adapters that you make in your own shop-can replace many special jigs. Save designing and tool room time . . . Eliminate excess "idle time" for drill presses . . . Assure faster, easier set-ups and re-tooling operations. Siewek Jigs are available in spring type for light

Siewek Jigs are available in spring type for light work and rack-and-pinion type for heavier uses. Right or left hand operation. They are built to precision standards—sturdy and simple in construction.

Write today for Siewek Jig Catalog 6-J.

SIEWEK TOOL DIVISION DOMESTIC INDUSTRIES, INC.,

231 SOUTH LA SALLE STREET . CHICAGO 4

SIEWEX TOOLS ARE SPEEDING THE WAR EFFORT



ILLINOIS . DISTRIBUTORS IN PRINCIPAL CITIES

dles

zned

lead

and ress r or t itt

the

the

ping ach-

the

1945

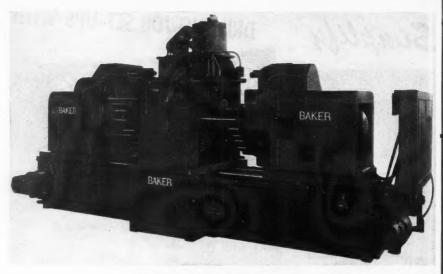


Fig. 1-Baker Special 31/2 x 24 Hydraulic Feed Machine

#### Baker Special Purpose Machines

Two machines for drilling nozzle plates for Navy rocket shells are announced by Baker Brothers, Inc., Toledo, Ohio. The machine shown in Fig. 1 is an adaptation of the company's  $3\frac{1}{2}$  x 24 hydraulic feed floor-type unit, incorporating two units into one large size two-way machine with trunnion fixture. The nozzle plate handled on this machine is 5 inches in diameter and includes 8 tapered holes located on a  $3\frac{1}{2}$ -inch large diameter taper. All 8 holes on the second side have a radius which is formed on the machine and which must be held concentric and

have a good finish. The tapered holes also require a high quality finish. All operations are performed on the machine at one chucking. At each cycle of the machine, one part is produced, all operations in the 8 holes being completed.

The machine shown in Fig. 2 comprises essentially a Baker 26-HO machine equipped with a special four-spindle fixed head and with a fully automatic cycle fixture including four 3-jaw chucks each chuck being arranged with automatic indexing. The part handled on this machine is a nozzle plate approximately 5 inches in diameter and 1½ inches thick having 8 tapered holes spaced equally on a circle and with 8



#### **EXPANDING MANDRELS**

Any size hole within a 1" range of infinite variation! That's what one size Champion Expanding Mandrel will completely and accurately handle. The hardened steel flexible sleeve automatically expands to the correct size as it is raised on the tapered arbor. Only 12 champions needed for range from  $V_2$ " to  $6V_2$ ". Eliminates numerous solid mandrel sixes. More convenient. Proved for years by thousands of shops.

COSTS 2/3 LESS



Th

This

hed low incl ing vide mov

hec

for

"T"

fied

foo

clud

4 N

ran

--5

mun

Max

19".

base

-3

trate
in b

Sep

# husky accurate

A New Low-Cost 18" Drill Press That Can Really Take It

This new Duro 18" Drill Press has been designed and built to handle a much heavier load continuously than ordinary low-priced units. Has many new features including: special design for quick-changing of belts; head casting slotted to provide take-up when wear develops from movement of quill; six-spline telescopic self-aligning spindle that reduces plays heavy ribbed cast iron table and base with large machined surface and grooves for collecting coolant; base provided with "T" slots for bolting jigs; improved simplified depth gauge. Efficient production foot feed available. Specifications include: 3/4" capacity. No. 2 Morse Taper. 4 New Departure Ball Bearings, Speed range 425 to 2030 R.P.M. Spindle travel -5". Drills to center of 18" circle. Maximum distance from base to spindle-49". Maximum distance from table to spindle— 19". Overall Height-68". Size of overall base—18" x 281/2". Diameter of column -31/2". Weight of Model A3088 (as illustrated) less motor, 350 lbs. Also available in bench model.

All

ma-

ycle ced,

om-

ma-

pin-

uto--jaw with

dled

noles

th 8

1945

ap-



Send for Catalog—showing low-cost single and multi-spindle Drill Presses, Metal-Cutting Band Saws, Circular Saws, Jointers, Router, Shapers, Grinders, Lathes, Scroll Saws, Flexible Shaft Units, and Portable Electric Drills. Gives full specifications and prices.

**Available on Priorities Only** 

# DURO TOOLS

MACHINE TOOL DIVISION

DURO METAL PRODUCTS CO., 2671 N. KILDARE AVE., CHICAGO 39, ILL.

ALSO MAKERS OF DURO HAND TOOLS

## ORDER TODAY!

H.S. "LONG" — "LONG" H.S.

Immediate Delivery

	Wire Gauge	Y male	Price Each
	Number 1	Length 61/8	\$1.08
	2	61/8	1.08
	3-6	6	.99
	7-12	6	.99
	13-22	53/4	.93
	23-26	53/8	.82
a.	27-29	53/8	.82
8	30	51/8	.82
12	31-33	51/8	.75
	34-35	51/8	.75
	36-38	51/8	.53
A	39-40	51/8	.53
	41	43/4	.50
	42-43	43/4	.50
	44	43/4	.50
	45-46	41/2	.50
	47	41/2	.50
/-	48-49	41/2	.50
1	49-51	41/2	.50
	52-56	41/4	.50
	57-60	41/4	.50

Satisfaction Guaranteed

SUPPLY CO.
176 GRAND STREET
New York 13, N. Y.

SEND FOR OUR CATALOGUE

holes at an angle on the circle. The machine is constructed to drill four nozzle plates at a time. Four parts are chucked in the four 3-jaw chucks, one under each spindle, to allow for drilling of one hole at a time. The chucks are mounted at angles to allow for angle drilling on each part, the holes being drilled from solid with special drills to operate the machine, the workman loads four parts.

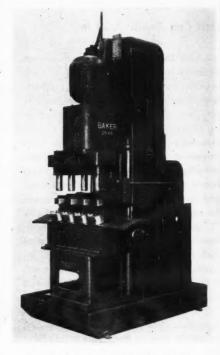


Fig. 2—Baker Special 26-HO Machine

one in each chuck, and then pushes a button to start the machining cycle. The machine continues through the automatic cycle until 8 holes are drilled in each part. The work-holding chucks are electrically interlocked with the machine cycle so as to automatically index when necessary.

#### Drilpilot

Manufacture of a tool for drilling and countersinking, drilling and spot-facing, or drilling and counterboring in one FOR

to de

prod

An o

Blade

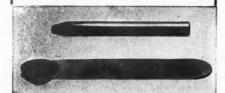


eptember, 1945

operation is announced by Aircraft Tools, Inc., 750 E. Gage Ave., Los Angeles 1, Calif. Of rigid, simple construction, the tool, which is designated as the Drilpilot, is made of high speed steel which is carefully ground to close tolerances after hardening.

The body of the drill is 5.8 inches long with  $\frac{1}{16}$ -inch flute length, thus leaving  $\frac{1}{16}$  inch of solid drill body which acts as a pilot after a hole is drilled. The shank is 0.086 inch in diameter and  $\frac{1}{16}$ -inch long. The tool is available in standard rivet sizes of Nos. 40, 30, 21,

# BURR-OFF



For Removing Burr or Chamfering Holes and Slots of Fork-Shaped Parts.

EFFICIENT • DURABLE • SIMPLE INEXPENSIVE

TOOL IMPROVEMENT CO., INC.
SEAFORD. NEW YORK

**General Sales Agent** 

JOHN H. GRAHAM AND CO., INC. 105 Duene St., New York, N. Y.

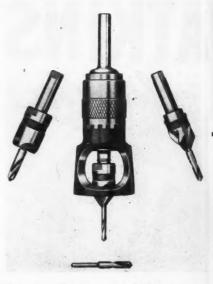


Illustration showing counterboring, countersinking, and spotfacing tools equipped with Drilpilot

and 10 and can be used in place of any standard pilot.

Readily interchangeable from one tool to another, the Drilpilot, in combination with the company's standard stop countersink or microset stop countersink, allows for drilling and countersinking in one operation to a predetermined depth of countersink. Used with standard angle drill adapters or angle drill attachments, the tool can be used in performing drilling and countersinking or drilling and spot-facing operations in hard-to-get-at areas.

The Drilpilot can be used in connec-



#### **BAND SAW WELDERS**

No. 141 may be had without grinder or with grinder for removing flash. Has 6 point heat control, one for annealing weld.

Welds saws 3/4" wide and smaller.

110 volt 60 cycle single phase. Can be made in 220 volt.

Send for catalog.

WELDEX INC.

7327 McDonald Ave. DETROIT Pr

as

to

be

ve

att

the

KEL

Septe

# Keep your KELLERFLEX Busy

The many attachments and accessories available make it ideal for all kinds of . . . FILING SANDING LAPPING BURRING GRINDING POLISHING WIRE BRUSHING

Pratt & Whitney KELLERFLEX Flexible Shaft Machines are known as "the most versatile machines in the shop". There's almost no limit to the number of jobs they can undertake... and do them easier, faster, better, at less cost. These "mechanical muscles" are a big-paying investment for any shop. Keep them busy... use their wide variety of attachments and accessories to get the most out of them. Write for the new KELLERFLEX catalog which gives you full information on these machines... their many attachments and uses.

PRATT & WHITNEY
Division NILES-BEMENT-POND COMPANY
KELLERFLEX SALES DEPARTMENT
WEST HERTFORD 1, CONN.



nter-

any

tool inastop ter-

ter-

eterwith

ngle 1sed

inkera-

nec-

1945

tion with replaceable shank countersinks or replaceable shank spot-facers, thus combining drilling and countersinking or spot-facing with hand or machine drilling.

#### "Jiffy Jig" Model J-10A Lever-Operated Chuck

Designed for use in vertical setups only, a simplified model of its "Jiffy Jig" Lever-Operated Chuck, designated as the Model J-10A, is announced by the Monarch Governor Co., 1832 W. Bethune Ave., Detroit 6, Mich. Except for the bracket that allows for horizontal setups, the Model J-10A includes all of the features of the previously announced Model J-10 and is readily adaptable to various machine tools for use in performing drilling, milling grinding, boring, and other operations. It is designed to provide ample chip clearance, and, when either opened or closed, the collet is said to have absolute zero axial movement.

The Jiffy Jig Model J-10A consists essentially of three parts; namely, a cap, base, and operating lever, the taper on the cap conforming to that of the



"Jiffy Jig" Model J-10A Lever-Operated Chuck

collet. With the proper size collet in place, the cap is screwed down on the base until the collet opens and closes as desired. The operating lever is then screwed into the unit in a convenient location, and the Jiffy Jig is ready to use. The unit may also be used in con-

# PRECISION ACCURACY



"HOLOCATOR."

ABOUT 75% OF THE WORK THAT HAS TO BE PERFORMED ON A JIG BORING MACHINE CAN BE TAKEN CARE OF ON THIS PRECISION DEVICE.

All precision drilling such as locating drilled or reamed holes, as well as laying out of dies and drill jigs, can be performed on an ordinary drill press.

Write for illustrated bulletin No. 108-12.

## DAYTON ROGERS MANUFACTURING CO.

2835 12th Ave. So. Minneapells 7, Minn.



266

Do

fro

cri

she

ac

Sep



Hundreds of short cuts—bottlenecks eliminated
—thousands of man hours saved every week
—it's easy when you make full use of the
DoALL.

Cut a special wrench out of bar stock, a die from a 10<sup>n</sup> block, a replacement part for some crippled machine, 50 to 100 shapes from stacked sheets, or other production work.

The DoALL does internal and external cutting—accommodates a whole series of narrow, hard-

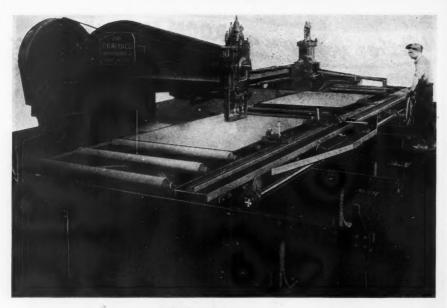
toothed band saws to cut any kind of material quickly and so smoothly that finish machining is rarely necessary.

Six models available, each equipped with Variable Speed Control, Job Selector showing the proper saw to use for each material, and motors—all set up, ready to operate.

Learn more about the DoALL, which soon pays for itself in time and metal savings. Send for illustrated literature today.



1945



Thomas Plate Duplicator

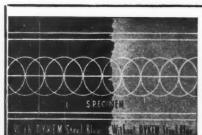
junction with an automatic spring ejector, and, wherever Mongovco No. 2 Jiffy Jig collets are not available, Warner & Swasey No. 2 collets may be substituted.

#### **Thomas Plate Duplicator**

Designed for use in railroad car shops, structural steel and fabricating shops for punching short runs and irregular shapes with mass production efficiency, the Thomas Plate Duplicator illustrated

herewith, product of the Thomas Machine Manufacturing Co., Pittsburgh 23, Pa., provides for the rapid, accurate duplication of holes, notches, coping, and so on, in plates and panels in runs of two to several thousand. It is said to be particularly useful where large varieties of plates are handled since it requires no setting up and is readily adaptable from one job to another.

The Thomas Plate Duplicator comprises a deep throat punch with solenoid control clutch, a templet pin cluster connected by shafts to a punching tool head, and an all-steel table having



## DYKEM STEEL BLUE

#### Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

#### THE DYKEM COMPANY

2301 F. NORTH 11th ST.

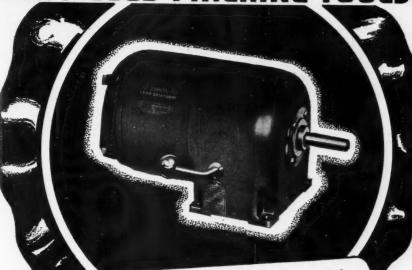
ST. LOUIS, MO.

(In Canada: 444 Pacific Ave., Toronto, Ont.)

Septe

# Designed

TO EFFICIENTLY MOTORIZE NEW & USED MACHINE TOOLS



LIMA GEARSHIFT DRIVES, in sizes from ½ to 20 hp, offer many advantages for speeding up production, increasing safety and lowering operating costs in your plant. Wire or write today for bulletins, or factory recommendations. LIMA GEARSHIFT DRIVES are now available for early delivery.

#### THE LIMA ELECTRIC MOTOR CO.



Z3, ate ng.

aid rge it lily

omole-

us-

ing

ing

0.

945

116 FINDLAY ROAD

REPRESENTATION IN MOST PRINCIPAL CITIES

LIMA GEARSHIFT DRIVES



eptember, 1945

MODERN MACHINE SHOP

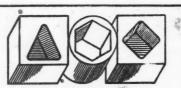
269

rollers for supporting the plates to be punched. Roller bearing track wheels support the table, which is moved by pinions engaging track racks and is

controlled by a handwheel.

In operating the unit, the plate and templet are clamped to a heavy panel section carriage. Using the handwheel the operator moves the templet under the desired locating pin. By means of a foot switch operating a solenoid, he forces the pointed locating pin down through a hole in the templet, thus pulling the table into position under the punch and also operating the gag on

the punching tool selected and engaging the punch by means of the solenoid. In this manner, the punching is made. Holes can be punched diagonally or in any direction and as many as 11 tools, including round, square, and slotting tools, may be set in the punch. When shifting from one tool to another, a lever is simply operated accordingly. The design of the Thomas Plate Duplicator includes an oscillating stripper to hold light work where distortion might occur. The rollers on each side of the punch are spring mounted so that the plate rides free of the dies. According to the manufacturer, the duplicator has an accuracy of between to to inch and may be used in punching holes up to 6 inches in diameter.



#### DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS Wilmerding, Pg.



#### Southwark Universal Fatigue Testing Machines,

The increasing demand for fatigue testing equipment that will handle small pieces or sub-assemblies of larger structures has led to the development of two universal fatigue testing machines, designated as Nos. SF-10-U and SF-1-U, by the Southwark Division of The Baldwin Locomotive Works, Philadelphia 42, Pa. The machines are said to be ideally suited for the testing of automotive and airplane parts or any structural components or specimens.

The Southwark No. SF-10-U Universal Fatigue Testing Machine provides a dynamic load application of 20,000 lb. in one direction which is made possible through a hydraulic preloading attachment of 10,000- lb. capacity. The high operating speed of approximately 2,000 load cycles per minute, at constant force as opposed to constant deflection is an outstanding feature of the ma-

#### **New Nesting Type Tote Pans**



20" long x 12" wide x 61/2" deep.

16 ga., drag holes and handles both ends.

J. L. LUCAS & SON, INC. Bridgeport, Conn. ngagnoid. nade. or in tools, tting When er, a ngly. Ouplier to night f the t the rding r has inch es up

ue tigue small trucf two des-U, by dwin

, Pa. leally and comrersal a dy-

b. in ssible tachhigh 2.000stant ction

ma-

ns

ends.

1945



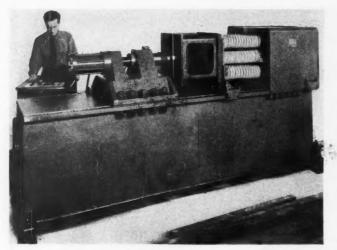


or left hand internal or external threads 1" in diameter up to 4" O.D. inclusive and up to 6" I.D. depending on the contour of the piece. 3" long up to 1/2" pitch and covering full length of thread through annular milling cutters. Completely hydraulic work cycle and a variable speed drive permits the selection Write for complete catalogue to Dept. M-3

MURCHEY MACHINE & TOOL CO. DETROIT 26, MICHIGAN

Murchey also manufactures all types of Collapsible Taps, Self Opening Die Heads and Shell Tapping Machines. Write for literature on any or all of these products.

MODERN MACHINE SHOP



Southwark No. SF-10 Universal Fatigue **Testing Machine** 

sizes and shapes

of specimens tension-compression, bending, or torsion are available for the machine. The standard distance between plates is 4 feet, however, the muchine can easily be adjusted for longer specimens. The dynamic load is produced by a centrifugal force type oscillator, the force of which is amplified by working near resonance

of the system. The load is measured and controlled electronically. The maximum alternating force is plus or minus 10,000 lb., which may be applied in increments of 10 pounds.

The Southwark No. SF-1-U Universal

chine. According to the manufacturer, any predetermined alternating load is kept automatically constant regardless of the changes of deflection that may occur in the specimen under test.

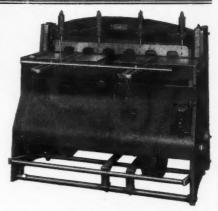
Accessory tools for testing various

# POWER SQUARING SHEAR

Well-made, small size squaring shears now available in several sizes. Made in 36" and 42" width, 16 ga. capacity; in 42" width, 14 ga. capacity; and 60" width, 12 ga. capacity. Easy working, fast action, accurate blade adjustment, and with adjustable front and back gauges.

# No. 5 Jr. PUNCH





A handy tool for all sheet metal workers. Capacity 1/4" hole in 16 ga. mild iron. Will punch in center of 4" disc. In metal kit with 7 punches and dies.

Write for new catalog.

WHITNEY METAL TOOL COMPANY ROCKFORD. ILL 110 FORBES ST.

Keep your "mikes" accurate! CHECK THEM CONSTANTLY WITH SCHERR MICROMETER PARALLELS

When spindle end or anvil surface of a micrometer wear out of parallelism, the mike's accuracy is affected - a condition which ordinarily becomes apparent only after trouble has resulted. An occasional check with Scherr Micrometer Parallels will avoid this, and tell you when the micrometer measuring surfaces begin to need refinishing.

The two optical flats differ in thickness approximately one half turn of the micrometer spindle. Their use is simple. Close the spindle on one of the optical flats and observe the light rays at points of contact. Then measure the other optical flat in the same way, If the interference bands appear the same, no correction is needed. If they differ in appearance, parallelism has been lost.

This is the way the makers check new micrometers. Why not use their approved method? SET OF TWO OPTICAL FLATS, AS SHOWN-\$25.00.

Here's how you use the Scherr Micrometer Parallels. Stripes or bands of different colors appear where anvil and spindle surfaces touch the glass. Those bands tell the truth about flatness and parallelism, fully described in 8-page catalog.

#### REED MICROMETERS

CALL SHOW SHOW

10-day money Scherr tools. Write measuring. for details on our TOOLAS SHOWN. full line.

Vernier gives 1/10,000 readings in 1, 2 and 3" sizes. Micrometer screw burnished for added hard-ness and long wear. Insures back offer on all close, sensitive \$5.73, POSTAGE PREPAID. IMME-DIATE DELIVERY - ORDER NOW.

GEO. SCHERE CO., Inc. 198-A LAFAYETTE STREET

F-10

tigue ne

apes in oresor vailmaandbeis 4 the easil for nens. load by a force , the ch is vorkance ured naxi-

inus

n in-

ersal

ty 1/4"

disc.

, 1945



"Sure we can keep up with the men on drilling! It's a cinch with a Clark!

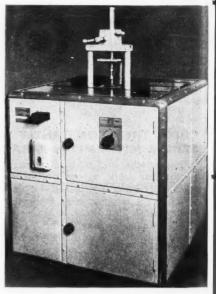
They're compact ... nicely balanced ... easy to handle ... just what we women prefer!"

If you have women workers using electric drills, better give 'em Clark's. They'll do better jobs . . . produce more work with dependable Clark Electric Tools,

Clark

Jas. Clark, Jr. Electric Co. 620 Bergman St., Louisville 3, Ky. Fatigue Testing Machine has a 1,000 lb. alternating force capacity as well as a static preloading attachment which results in a force capacity of 2,000 lb. in one direction. It is designed for tests in tension-compression, bending, or torsion.

The torsion testing attachments available for the No. SF-1-U have capacities up to 30,000 inch-pounds and permit the testing of specimens exceeding 1 inch in diameter. The standard tension-compression fixture for testing specimens is



Southwark No. SF-1-U Universal Fatigue Testing Machine

equipped with tapered collets to grip plain cylindrical pieces. Bending fixtures are available up to 6,000 inchpounds bending moment for testing flat plate specimens up to approximately % inch in steel, ½ inch in aluminum alloys, and 1 inch in plastics.

As in the case of the No. SF-10-U machine, the No. SF-1-U tester operates at high speed and may be set for any predetermined alternating load which is then automatically kept constant. An inertia force compensator of simple construction eliminates all inertia forces, and the accuracy of loads transmitted is said to be kept well within plus or minus 2 per cent. The entire mechanism

# Judge a coolant pump by the company it keeps

You can best judge a coolant pump by finding out who uses it.

00 lb. as a

h relb. in sts in

rsion.

availcities
it the
inch
-com-

tigue

grip

g fixinchng flat

mately

U mates at y preich is t. An simple forces,

mitted

lus or nanism

er, 1945

Ruthman Gusher Coolant Pumps are installed as standard equipment by many of the leading manufacturers of machine tools all over the world. Experience has taught them that Ruthman Coolant Pumps give dependable long service with minimum maintenance cost.

These satisfied customers are your best guarantee of the service which Ruthman Gusher Coolant Pumps will give you. Specify Ruthman Pumps for all your coolant needs.

There's a Gusher for Every Coolant Requirement
Write Us Now for Catalog.

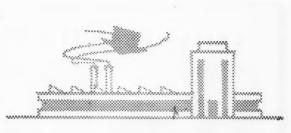








Model 11020-A





of the machine, including the large Tslotted work table attached for use in testing assemblies structural components or parts, is seismically suspended in the frame to eliminate the transmission of vibration to the floor.

#### "Thermicast"

Development of a special type of thermit for producing steel castings, to be known as "Thermicast," has been announced by the Metal and Thermit Corp., 120 Broadway, New York, N. Y. The thermit is said to solve the problem of obtaining sound, clean steel castings, quickly and simply, irrespective of size and intricacy of shape when regular steel melting facilities are unavailable.

Thermicast utilizes the well-known thermit reaction, requiring neither fuel nor electric power, the reaction being carried out in a specially designed conical-shaped crucible of sheet steel lined with refractory material. According to the manufacturer, most of the equipment required to produce the castings can be improvised, and little experience is necessary to produce steel castings by the process.

Thermicast is available in 41-lb. bags, each of which is said to produce approximately 25 lb. of steel. The Thermicast steel, as cast, has the following average physical properties: yield point, 39,250 p.s.i.; tensile strength, 70,200 p.s.i.; per cent elongation in 2 inches, 30.1; per cent reduction in area, 51.2.

#### Steel City Type "P" Portable Hardness Testing Hammer

Designated as the Type "P," a portable hardness testing hammer which allows for the testing of materials directly on the spot is announced by the Steel City Testing Laboratory, 8843 Livernoise Ave., Detroit 4, Mich. Designed for easy operation by unskilled labor, the hammer can be used in making repeated tests without readjustment. A microscope and chart for use in checking the degree of hardness of workpieces is supplied with the unit.

The Steel City Type P Portable Hardness Testing Hammer consists of a cylindrical housing and easy moving piston. The housing is provided on one end with an inside thread cover and on



# lhese Globe products do precision work

Compact, Rugged Construction, Low in Cost! Immediate Delivery



IMPORTANT: When ordering or requesting prices on above items, be sure to give: 1. Make and model of lathe. 2. Lathe swing. 3. Power or hand cross feed. 4. State if lathe is equipped with telescoping taper attachment.



September, 1945

bags,

apermiwing oint.

70,200 ches. .2.

e

orta-

vhich

s di-8843 Decilled mak-

nent.

e in

s of

Iardof a oving one d on

it.

2

1945

MODERN MACHINE SHOP 277

3380 Robertson Blvd., Los Angeles 34, Calif.



CERROMATRIX (Melting Temp. 250° F.) For securing punch and die parts, anchoring machine parts without expensive drive fits, short run forming dies and other metalworking applications.

**CERROBEND** (Melting Temp. 158° F.) Used as a filler in bending thin-walled tubing to small radii. Easily removed in boiling water. Also used for aircraft assembly jigs, templates for forming dies and other purposes.

**CERROSAFE** (Melting Temp. 190° F.) Used to accurately proof-cast cavities such as molds, gun chambers, forging dies, etc., and many similar applications.

#### REPRESENTATIVES AND DISTRIBUTORS

**Brooklyn, N. Y.**, Belmont Smelting and Refining Works

Ansonia, Conn., Jackson Associates
Boston, Mass., Jackson Associates
Philadelphia, Pa., Castaloy Metal Sales Co.
Cleveland, Ohio, Die Supply Co.
Detroit, Mich., Castaloy Metal Sales Co.
Chicago, Ill., Sterling Products Co., Inc.
Moline, Ill., Sterling Products Co., Inc.
Milwaukee, Wis., Harry C. Kettleson, Inc.
Minneapolis, Minn., Northern Machinery &
Supply Co.

St. Louis, Mo., Metal Goods Corporation
Kansas City, Mo., Metal Goods Corporation
New Orleans, La., Metal Goods Corporation
Dallas, Tex., Metal Goods Corporation
Houston, Tex., Metal Goods Corporation
Los Angeles, Calif., Castaloy Metal Sales Co.
Tulsa. Okla., Metal Goods Corporation
Toronto, Canada Metal Co., Ltd.
London, Eng., Mining & Chem. Products. Ltd.

# **Cerro De Pasco Copper Corporation**

40 WALL ST. NEW YORK 5, N. Y.

the other end with an open bushing. Between the cover and the piston is a strong spring which presses the piston against the bushing. The tension of the spring can be adjusted by turning the cover if the hammer is to be set with a stroke of certain power. The piston is coupled with a striking piston which projects through the bore of the housing guided by an air-tight fitting ring in the cylinder and having a steel ball on the end.

By resting the hammer with the ball



Steel City Type "P" Portable Hardness Testing Hammer in Use

against the material to be tested and pressing on the operating end, the striking piston and the piston in the housing move inward and press against the spring between the piston and the cover. At a particular point in the movement the coupling between the piston and the striking bolt is released so that the piston, under pressure of the spring moves against the inner and of the striking bolt and the ball striking against the material to be tested. After the hammer is released, the striking bolt or piston is returned to its former position by a spring in the cylinder. The cushion of compressed air adjacent to

e

fe

fa

ir



One ten-thousandth of an inch does count in aircraft engines—and Staples Expansion Reamers are accurate right down to that fourth decimal place. That's why the Staples Piloted Expansion Reamer is used to attain uniform precision accuracy in multiple hole reaming operations in building Pratt & Whitney Wasp engines. And also why Staples, within a few years of its organization, was manufacturing 90% of all carbide reamers used in aircraft engine work.

Today Staples, because of its greatly expanded facilities, can supply reamers and other carboloy-tipped circular cutting tools to every producer who needs and appreciates aircraft accuracy in his finished parts. Standard tools in stock—special tools designed on request. Write for catalog and full information.

Staples Tool & Engineering Company Cincinnati 25 . . . . . Ohio

Staples CARBOLOY-TIPPED CIRCULAR CUTTING TOOLS

REAMERS · CORE DRILLS · SPOT FACERS · COUNTERBORES · END MILLS · SHELL END MILLS · ALSO A COMPLETE LINE OF CIRCULAR SPECIAL TOOLS

ing. is a ston

the the with ston hich ousg in l on ball

SS

and

trik-

ising

the

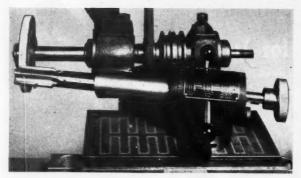
nent. and

t the ring. the

iking

After bolt posi-The

1945



the guiding ring causes a slow backward movement of the ball and thus prevents the possibility of spoiling the impression made. Reading Tap Grinder Fitted with Special Adaptor Sleeve for Grinding Extra Large Taps

Cincinnati, Ohio, can be used to grind taps of much larger size than the machine was originally designed for.

The illustration shows a Reading Tap Grinder set up to grind a 1½-inch tap. The regular chuck has been removed, and the special adaptor sleeve fitted to the tap grinder spindle, thus pro-

viding the necessary capacity for grinding the large tap. The special equipment is available from the manufacturers of the grinder.

#### Reading Tap Grinder for Grinding Large Taps

By using a special adaptor sleeve, the Reading Tap Grinder, product of The Reading Machine Company, Reading,

#### Fitchburg Triple Head Plunge-Cut Grinder

The Fitchburg Grinding Machine Corp., Fitchburg, Mass., announces a special multiple precision grinding ma-

#### FAST ACCURATE INSPECTION

Smith Master Surface Plates make possible fast accurate inspections for all types of work. They're flat within 0.0001"... they're rigid, right to the edge... and they're hand flaked. But first they were scientifically de-

signed on sound engineering principles. And they're built by craftsmen for precision jobs. That's why Smith Master Surface Plates are more accurate and permit faster inspection.

Ask for information on the complete Smith line of Precision Plates.

SMITH MASTER SURFACE PLATE AND STAND

SMITH TOOL & ENGINEERING CO.

854 Sandusky Ave. BUCYRUS, OHIO

Smith PRECISION Plates

Fitted Sleeve rige

an be os of than rigin-

hows inder 11/4gular oved, aptor e tap s prorindment rs of

gechine es a ma-

ve.

110

, 1945





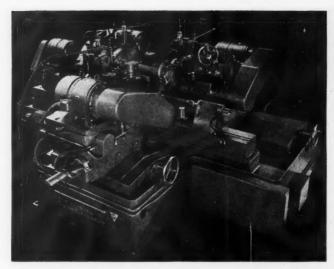
#### There's more than meets the eye . . . in DESSAU DIAMOND TOOLS

Dessau Diamond Tools may bear an outward resemblance to other diamond tools but from that point on, the similarity ends. In Dessau Diamond Tools, it's what you can't see that counts most-the meticulous, personal care with which Dessau Diamonds are selected-the masterly analysis of each tool's individual task-and above all, the 104 year record of reliability which stands squarely behind every Dessau Diamond Tool in action!





535 Fifth Avenue . New York 17, N.Y.



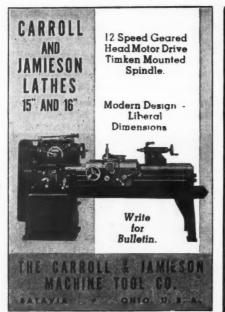
chine for plunge-cut grinding three spottings on 96-inch torsion springs for tanks. This triple head grinder is arranged to machine all dimensions at the

Fitchburg Triple Head Plunge - Cut Grinder

same time within the time of the longest single grinding operation and in one setting.

The Bowage Head precision grinding wheel units included in the design of the machine are standard and interchangeable. If any operation is discontinued, the heads can readily be used elsewhere. either on standard machines or regrouped and remounted on new special bases.

General specifications of the Fitchburg Triple Head Plunge-Cut Grinder are as follows: normal swing over table, 6 inches; maximum swing over





Exchange and Glasgow Sts. ROCHESTER, N. Y.

nder thin the ngle perone age ion eel in the anderany dised, can sed ther maoupnted cial itchnder

over

a

1945

Head

RIGHT in the GROOVE

Es, correct for cleaning up both bottom and sides of beveled grooves is this "wheel" type Nicholson Cylindrical Shape Double Taper Rotary File (made in both Hand Cut and Ground types). It is also used to clean out large gears; and in the aircraft industry where, in the *Ground* type, it is widely used for work on cylinder head fins which may have been damaged in the casting process, or to blend out fins which may have broken out.

Nicholson Rotary Files are fast-working, time-saving, problem-solving. Bearing the Nicholson trade-mark, they assure everything to be desired in the way of trueness, proper cut, expert hardening, fine high-speed steel.

WRITE FOR CATALOG AND PRICE LIST—and for any special information you desire. For deliveries, consult your mill-supply house.

NICHOLSON FILE CO., 93 ACORN ST., PROVIDENCE 1, R. I.

(In Canada, Port Hope, Ont.)

## 16 STANDARD SHAPES

(in either Hand Cut or Ground). 3 cuts-Coarse, Medium, Fine. Stock diameters-1/8" to 11/8".



HAND CUT GROUND

# NICHOLSON ROTARY FILES

HAND CUT AND GROUND-FOR EVERY PURPOSE



table, 18½ inches; maximum diameter with 3-inch rapid traverse, 6 inches; maximum distance between centers, 96 inches; height from floor to center, 43% inches; floor space, 148 x 179 inches.

#### S-C Universal Laboratory Furnace UL-6-12

Designed to fulfill the requirements of a wide variety of applications, a "threeway" bench type universal laboratory furnace designated as the UL-6-12 has been brought out by the Surface Com-

# BRADFORD METALMASTER LATHES

141/2" - 161/2" - 181/2" Swing

TOOLROOM AND ENGINE TYPES

... Also ...

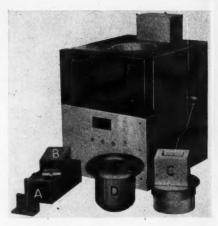
1840 - 1945

CAM FEED
UNIT TYPE
DRILLING AND
TAPPING
MACHINES

### The Bradford Machine Tool Co.

Evans at 8th St.

Cincinnati 4, Ohio



S-C Universal Laboratory Furnace UL-6-12 with accessory equipment including (A) muffle, (B) protective atmosphere equipment, (C) plug, and (D) pot

bustion Corp., Toledo 1, Ohio. Featuring controlled operation over a wide range of temperatures, the furnace may be used as a direct-fired unit at temperatures from 300 to 2,400 deg. F. For direct heating, a muffle can be placed on the hearth. If an atmosphere is desired, a diamond block can be used in the muffle. A removable plug built into the arch of the furnace provides a means for inserting a pot.

The S-C Universal Laboratory Furnace UL-6-12 is said to be ideal for small shops or laboratories where a wide variety of heat treatments on relatively small quantities of small parts must be performed. Such operations as annealing, carburizing, hardening, cyaniding, and tempering, with or with-

# Actual Size Photo 3 Cayal Size—Common 3 Cayal Size—Common

## DIAMONDS for Production

RE-SET-ABLE • BIG-HED-NIB
(Trade Marks Registered)

LOC-KEY-SET by Patented Process U. S. Pat. 2,351,741

Factory Branches
Jobbers
Everywhere

RE-SET-ABLE adds to life of your diamond
 ... More work per carat. Exclusive patented setting is tender to the diamond ...
Holds firmly ... Protects from damage
 ... Guards against breakage.

No. 24 CN RE-SET-ABLES are now selling in 100 lots. Ask for easy No. 4 Catalog and Grinder's Instruction Card. Shows sizes to fit your machines. Tools backed by service unequalled.

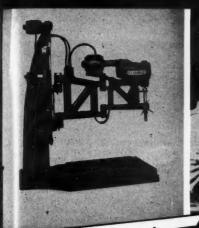
All diamonds are LOC-KEY-SET for immediate shipment... Tools numbered in units of 3/c curse (No. size) and extered in units of 3/c curse (No. size) and extered to denote quality of damage. Common (C), Medium (M), Select (S), (4/s-hour restring service \$1.00 postpaid.) Bigger stones in C grade are genuine economy in diamond use. For large wheels we recommend Mo. 60-CN.

Precision Grindin Precision Grindin Production Line

with

"RE-SET-ABLE"

DIAMOND TOOL COMPANY, Not Inc. 938 F 41st Street CHICAGO 15, III



Convenient

for

miscellaneous drilling
and tapping operations

For drilling or tapping miscellaneous holes over a large layout the Hammond Radial is an ideal choice. With its unique bracket type construction the spindle can be swung quickly from hole to hole without any intermediate adjustment. Six quick speed changes are instantly available and the Hammond tapping reverse is very fast and convenient to operate

when there are a wide variety of sizes and depths of tapped holes. Write, wire or phone for prices and delivery information.

THE FOOTE-BURT COMPANY CLEVELAND 8, OHIO

Detroit Office: General Motors Building
MOVE UP THE SCHEDULE



FOOTBURT-HAMMOND
Radial Drilling Machines

L-6-12 mufent,

uring range y be nper-or died on sired, a the o the neans

Furl for
re a
relaparts
as as
cywith-

E"

n



out a furnace atmosphere, can be handled by the unit which may also be used for melting soft and light metals, including tin, lead, aluminum, magnesium and so on.

The furnace is equipped with three atmosphere-type gas burners, each of which can be independently controlled. The burners are arranged under the hearth to provide uniform and rapid heating throughout the heating chamber. A gas pressure regulator is said to assure uniform control of burner operation. Fuel under low pressure without air under pressure is claimed to be sufficient for burner operation, such as manufactured or natural gas at 3 to 6-inch water pressure or butane or propane at 9 to 11-inch pressure.

pane at 9 to 11-inch pressure. Specifications of the S-C Universal Laboratory Furnace UL-6-12 are as follows: Hearth, 6 inches wide x 12 inches long; door, 5¼ inches wide x 4¼ inches high; overall width of the furnace. 19½ inches; length, 21% inches; height, 29 inches; hours to heat from cold to 2,400 deg. F., 2; maximum gas demand,

90,000 B.T.U. per hour.

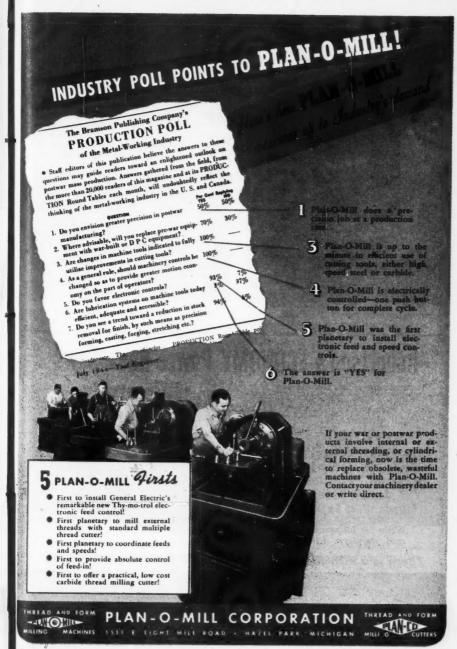
### Landis 12 x 28-Inch Universal and Tool Grinder

A completely redesigned 12 x 28-inch universal and tool grinder for cylindrical, internal, taper, surface, tool sharpening, and form tool grinding is an-Tool Co... nounced by the Landis Tool Co., Waynesboro, Penn. The headstock includes a combination live and dead spindle which is constructed so as to eliminate the need for changing belts or guards when shifting from live to dead spindle. Work speeds are con-trolled by means of a dial located on the front of the machine. The spindle and faceplate are mounted on superprecision preloaded ball bearings. The headstock construction is such that faceplate overhang is reduced to a minimum, with maximum work visibility assured by the low height of the head.

Starting and stopping of the work and traverse are effected by a single lever, with either action being controlled independently of the other. This lever is also used for automatically disengaging the hand traverse when the table is operated by power. The footstock is fully protected from water and grit. The swivel table is provided with a large inverted vee to ensure correct alignment of the headstock, footstock and various fixtures. The table is ar-

468 SHREWSBURY STREET

WORCESTER, MASSACHUSETTS



September, 1945

han-

used, insium e atl of olled. the

nam-

id to

vith-

o be

h as

to 6-

proersal

fol-

ches innace.

ight, d to

and,

and

inch ndriarp-

an-Cö., c indead s to belts e to

con-

ndle per-

that

min-

ility ead.

work

ngle

con-

This

dis-

the

and with

rrect

tock

ar-





ranged for swiveling 180 degrees on a hardened and ground pin.

The four-speed power traverse drive includes an accurate reversing mechanism which is fully enclosed in the bed of the machine. The hand traverse incorporates one speed for rapid movement and an extremely fine feed for shoulder and form tool grinding. The wheel spindle is mounted on super-precision preloaded ball bearings and is driven through V-belts by a well balanced motor mounted low at the rear of the column. The hardened and ground wheel spindle elevating screw is supported on preloaded ball bearings and is completely enclosed. The two-piece nut is provided with an automatic adjustment for wear.

The wheel slide is mounted on a vee and flat way. The cross feed is effected through a hard-

ened and ground fully enclosed screw operating in a two-piece nut which includes an automatic adjustment for wear. The cross-feed handwheel is provided with a coarse and an extremely fine feed.

The motor, generator set, and elec-

### Robertson's ECONOMY Power Hack Saws

The machine illustrated is the ROBERTSON ECONOMY No. 5-B. Capacity, 8" x 15". Blades, 12"-24". 6" stroke.

#### Features

Rugged Simplicity Long Life Hairline Accuracy Righ Speed Long Blade Life **Large Bearings Few Adjustments** Hydraulic Lift on Back Stroke

> Write for information and delivery dates.



There is a ROBERTSON ECONOMY SAW for every cutting job

W. ROBERTSON

MACHINE & FOUNDRY CO., INC.

RANO ST. BUSFALO 7, N. Y.

# Ingersoll FACE MILLS

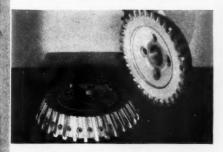
WHEN TO USE EACH OF FOUR BASIC DESIGNS

NGERSOLL presents four standard types of face mills, each designed for a particular class of work. All types are furnished with high speed steel, cast alloy, or carbide tipped blades; and are available in medium, heavy, and extra heavy series to accommodate dif-

ferent amounts of stock. Send us a complete description of your particular operation so we can recommend the proper series. Ask for a field engineer to call and make a survey of your requirements.



TYPE NX is a general purpose face mill recommended where a cutter of general application is required capable of taking heavy cuts on both face and periphery in cast iron and steel. There is no cutter which we can recommend as being more generally useful for medium and heavy milling. SHEAR CLEAR is a patented face milling cutter designed particularly for continuous chip materials. The discovery of new blade angles makes possible faster feeds, smoother finish, longer tool life and less power required. Will outperform any other face mill on flat surfaces. Will not cut into a corner.





CONE TYPE face mills are widely used general purpose cutters with lowest replacement blade cost. Suitable for small steps and shoulders. Medium duty used extensively for high production milling of cost iron, and extra heavy duty suitable for heaviest cuts on cast iron or steel. RAY BLADE face mills are intended for high production milling of cast iron. Particularly recommended for use with Rexalloy or other cast alloy blades. Both roughing and finishing types available with interchangeable blades.

THE INGERSOLL MILLING MACHINE CO., ROCKFORD, ILLINOIS

Manufacturers of Inserted Blade Milling and Boring Tools

and

fine tool e is prerivwell v at The

The heel supearsed. ided nent

ross irdrew infor pronely

trical controls are enclosed in the bed of the machine. In addition, a coolant tank is cast integral with the bed of the grinder, which can be obtained with a complete line of attachments for maintaining tools in efficient cutting condition.

### Polan Shop Microscope

Designed for the inspection of surface finishes, welded joints, small precision tools and parts, as well as for measur-

### BROACHES

Converted, Reconditioned, Sharpened. Prompt service on sharpening.

> Manufacturers of Broaches

Reconditioning, salvaging and converting high speed and carbide tipped metal cutting tools.

CONANT TOOL & ENGINEERING CO.

347 WEST 107TH STREET CHICAGO 28, ILLINOIS

ing dimensions smaller than 0.1 inch with accuracy of  $\pm 0.0002$  inch, the Polan Shop Microscope illustrated herawith has been placed on the market by Polan Industries, Huntington 19, West Virginia.

In addition to the standard reticle which permits accurate measurement to 0.001 inch, the instrument may be equipped with reticles having special designs for contour inpections or measurements of specific tolerances on tools or parts. Built-in lighting equipment consisting of a flashlight bulb and cells, makes the instrument unusually convenient to use. The 16.7-power Kellner eyepiece and the three-power acromatic objective afford an overmagnification of 50 power which is said to be adequate for normal inspection of machine parts.



Polan Shop Microscope

The Polan Shop Microscope includes a separate removable base, the bottom and sides of which are ground flat. The parallel sides, which are % inch from the optical center, have ground surfaces, thus enabling the instrument to be used with gage blocks and measuring wires. The bottom surface is provided with a prismatic groove which optically centers the instrument on round rods or curved surfaces of machines.



Se

the here-West WHEREVER ACCURATE BOLT TENSION IS REQUIRED DISTORTION caused by inaccurate tensioning of studs and COMPLETE RANGE OF TYPES AND SIZES bolts wastes power, promotes wear and is often the cause of mechanical failure. With Snap-on Torqueters precision tensioning is done more quickly and easily than "guesswork" tightening. Even inexperienced workers pull to specified tension every time . . they see the torque reading as pressure is applied . . they work swiftly, confidently, accurately. FOR PRODUCTION ASSEMBLY MAINTENANCE In many plants Snap-on Torqometers are standard wrench equipment for a wide range of assembly operations. Wherever Torqometers are used in the factory, it is equally important that they be used in service and maintenance work. The full range of Snap-on Torqometers is covered in the 1945 catalog of 3000 Snap-on tools for production, assembly, maintenance. Mailed on request. Write, SNAP-ON TOOLS CORPORATION 8032 I 28th Ave., Kenosha, Wisconsin. LEUN 10 SOUNDS " UP TO 2000 FOOT POUNDS des a ottom The from surnt to uring vided ically ds or

, 1945 September, 1945

inch

et by

MODERN MACHINE SHOP

### WALTHAM Thread Miller

For threading small parts. It will cut V, N.S., Acme, Whitworth and Metric threads, special threads, Special threads, Special threading is shown in insert at lert. Special head for relieving can also be furnished. Send us drawings or samples and we will gladly submit our suggestions, no obligation. Also makers of Small Milling Cutters, Sub Presses, Pinion and Gear Cutting Machines.

Write for illustrated bulletin.
Waltham Machine Works
Waltham • Mass.

# LEACH External Grinder

PRICE

\$875.00

**Fully Equipped** 

Grinds Work from 3/4" to 11" in length and from 1/8" to 7" in diameter.

Write us today for your nearest dealer's mame and address.

Send for Descriptive
Literature
EXCELLENT DELIVERIES



### Exclusive Selling Agents

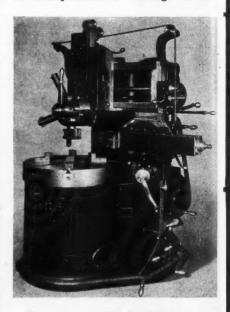
H. LEACH MACHINERY CO.

387 CHARLES ST. PROVIDENCE, R. I. Agents in all Principal Cities Throughout the World

### Rogers Improved "Perfect 36" Vertical Turret Mill

The accompanying illustration shows the Rogers Improved "Perfect 36" Vertical Turret Mill which is now being offered by the Rogers Machine Works, Inc., 1807 Elmwood Ave., Buffalo 7, N. Y.

Features of the machine include an adjustable 5-position main vertical turret that provides tool settings for bor-



Rogers Improved "Perfect 36" Vertical Turret Mill

ing, drilling, reaming, turning, and thread cutting. A quick-acting lever allows for rapid indexing of the turret head. The main stake features an adjustable swing up to 30 degrees either side of vertical in addition to being adjustable from left to right and up and down.

The specially designed swivel head can be set at any angle up to 35 degrees either side of horizontal. The head is also adjustable up and down and from left to right as being designed for indexing to 8 positions.

On production lines, setups can be easily and accurately duplicated by setting dials which are conveniently located at eye level to the operator. In



# FULMER HONING

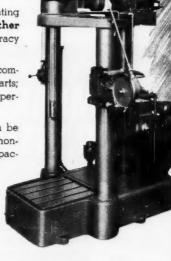
THE Fulmer Honing Machine produces round, straight, smooth bores to working tolerances as small as .0002".

Due to a wide range of spindle and reciprocating speeds, it removes material faster than any other known method for a comparable degree of accuracy and surface finish.

It is ideal for finishing aircraft, Diesel, gas and compressor cylinders; connecting rods; supercharger parts; landing gear struts; recoil cylinders—wherever superfine surfaces and extreme accuracy are required.

Cylinders of either small or large diameter can be honed on the Fulmer Honing Machine. Standard honing capacity is up to 20" inside diameter. Larger capacity on special order. Maximum stroke 72". Any conventional honing heads can be used. Write for complete information.

C. ALLEN FULMER COMPANY
1233 First National Bank Bldg., Cincinnati, Ohio



ORFCISION S

FINEE EQUIPMENT PISTON RING LAPPERS
SPECIAL MACHINERY
HONING MACHINES
ROD BORES

DEALERS: A few attractive territories remain open. Write today!

September, 1945

al

and er al-

urret just-

side table . head grees

d is

r in-

n be

set-

7 10-

addition, the horizontal chuck is scribed for accurately locating duplicate work. The output of finished work is further increased by a motor-driven rapid traverse. Convenient foot-operated levers are instantly accessible to the operator for rapid clutch and brake control and change-over of main drive speeds. The main gearbox is totally enclosed and the generated gears run in oil, providing for smooth operation and long gear life.

The Rogers Mill may be equipped with a special coolant system which is designed to deliver two streams of coolant to the tool and work by means of a self-contained and self-priming pump. Complete tooling is available with the machine, as well as four-jaw independent and three-jaw universal chucks or plain tables.

### Nelco Carbide-Tipped Milling Cutters and End Mills

A line of carbide-tipped milling cutters and end mills designed for machining all metals and plastics has been announced by the Nelco Tool Co., Inc.,

370 Hamilton Ave., Brooklyn 31, New York. The line includes two and fourflute carbide end mills from ¼ to 2inch diameter, large end mills up to



Nelco Carbide-Tipped Shell End Mill

Fast operating...has weight & rigidity...

5-inch diameter with No. 50 N. M. T. B. shanks, shell end mills, face mills, slotting cutters and half side mills up to 8 inches in diameter.

The cutters are of a heavy, rugged, brazed-in tyje. The bodies comprise special alloy castings having extremely high

strength. Carbide tips are unusually heavy so as to withstand shock and allow for many regrinds before being replaced. The tips are brazed to the cutter bodies by a special method which is said to greatly increase the number of pieces machined per grind and also greatly reduce the possibility of tip breakage.

Nelco Carbide-Tipped Milling Cutters and End Mills are designed for mounting on Standard No. 50 N. M. T. B.



15 6.51 SQUARE HEAD 10 POTAL 5 2.17 0 25 5 10 15 20 35 50 CAPACITY G.P.M.



For submerging in tank and mounting to cover.



For submerging in tank, or mounting integrally with cover.

# The CENTRIFUGAL PUMPS of Superformance!



New our-2to eter M.

ace

cut-

ich-

are

red, The ise ast-

exigh any al-

re-

ter

aid

ces re-

ers nt-

B.

45

For horizontalexternal mounting

• The advanced design and built-in efficiency of Superflo Pumps gives them increased capacity to the point where, a 1/8 H.P. model is equal in volume delivered to many 1/4 H.P. pumps.

Superflo's integral-streamline design gives compactness, strength and ease of installation. Dependable—service-free in performance, they are ideal for pumping coolants, cutting oils and lubricants, and are easily adapted to any machine. The flow can be regulated from a drip to a full stream without overloading the motor. Capacities from 9 to 44 gallons per minute. Models available for fluids with high abrasive content. There's a Superflo Pump for "superformance" on almost every application ... for replacement or as original equipment. Write and tell us your needs.



For submerging in coolant reservoir

GRAY-MILLS CO., 1948 Ridge Ave., Evanston, III.



### SUPERFLO CENTRIFUGAL PUMPS

PORTABLE COOLANT SYSTEMS • PORTABLE PUMPING UNITS
INDUSTRIAL FLUID REFRIGERATION • PARTS CLEANING SYSTEMS

spindles or standard milling cutter arbors. No special adapters are required for mounting the tools, which are said to allow for the efficient milling of steel when mounted on machines of old design or low-powered machinery.

#### Producto Indexing Head

Development of a fixture to allow for the indexing of work to be machined on milling or drilling units is announced by The Producto Machine Co., 960 Housatonic Ave., Bridgeport 1, Conn. The body and base are made of steel, and the quick-acting indexing mechanism consists of a ratchet plate operated by means of a handle and an automatic locking plunger for firmly locking the work after indexing.

The indexing head shown in the accompanying illustration is designed for indexing work up to 12 positions. The head can be equipped with an expanding collet which is tightened by means of a spanner nut as shown in the illustration, or the head can be fitted with a 4-inch three-jaw chuck for centering and holding the work. The oper-



Producto Indexing Head

ating handle, which allows for quick indexing, is controlled in its movement by an adjustable stop so as to regulate without error the exact spacing required. The flange provided on the head is designed for bolting to a machine.

General specifications of the Producto Indexing Head are as follows: diameter



Every box is instantly accessible when you use STACKRACKS. Heavy containers slide in and out like drawers—you can get at the contents of any one quickly and easily without disturbing the others. Parenged STACKRACKS, to fit your boxes, interlock to form stor-

STACKBINS IN STACKRACKS

Manufactured and sold in Canada exclusively by Walter H. Wickware, Ottawa.

WRITE STACKBIN CORP., 53 TROY ST., PROVIDENCE 1. R. I.

STACKBIN

"Stacked and



SYSTEM

Still Accessible"



# IT'S THE ANGLE FOR SUPER SLOT CUTTING

SUPER'S BI-AXIAL RAKE SLOTTING CUTTERS were developed to give maximum strength to the cutting edge which receives the initial impact at the start of each chip.

Finer finishes and faster production result when you use SUPER'S BI-AXIAL RAKE CUTTERS in your slotting operations.

Available in a wide range of standard sizes and in special sizes on special orders.

# LOOK AT THESE FEATURES!

- Carbide Tipped for Performance
- Develops Finer Finishes
- Faster, Vibrationless
   Cutting
- Prompt Delivery

### SUPER TOOL COMPANY

Carbide Tipped Tools

21650 Hoover Road, Detroit 13 Michigan

\* 4105 San Fernando Road, Glendale 4, California

1945

uick nent late renead e. ucto eter



 Pioneers in the riveting field. Head rivets from smallest to 5/8" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO. 96 Silliman Ave.

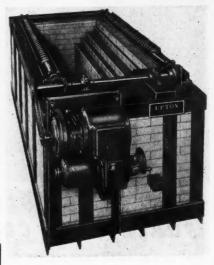
Bridgeport 5, Conn.



of body, 91/2 inches; overall length including clamping flange, 121/2 inches; overall height including collet, inches; net weight, 75 pounds.

### Upton High Speed Salt Bath

A high speed salt bath furnace designed for production quenching and especially suited for austempering high carbon and other steels is announced



Upton High Speed Salt Bath Furnace

by the Upton Electric Furnace Division, 7450 Melville Ave., Detroit, Mich. The furnace has a capacity for 1,000 lb. of work per hour at 700 deg. Fahrenheit.

According to the manufacturer, an exclusive step-back construction provides sufficient surface area to radiate and thus dissipate heat at a rate in excess of that brought into the furnace by heated work that is to be Electrodes located at the quenched. bottom of the furnace are said to supply the correct amount of heat to balance and thereby maintain the temperature of the salt in the furnace uniform throughout. Since the electrodes are at the bottom of the furnace where the added head is thus put in, circulation of the heated salt is natural and

MACHINERY COMPANY

THE FORY STREET PROVIDENCE SPHORE ISLAND

th inches: 61

ath

e deand high unced

Divi-

Mich.

00 lb.

heit. an

pro-

radi-

rate

the o be the pply ance

ature form are

here ircuand

1945

YOU really have to see it in operation to understand how

simple and adaptable it is: yet how rapid and accurate.

It checks inside diameters up to 24" for size, taper, bellmouth and out-of-round condition.

A special sizing plug is made to fit the production part. Any variation from the allowable tolerances is registered on the dial instantly by

Flexible hose connection and various types of sizing plugs and ring gages for gaging internal diameters. Finest precision workmanship.

the application of a scientific principle of air pressure and volume.

The dial can be calibrated to register .0001" or less. Operates on air pressure as low as 50 lbs.

A flexible hose adaptor is used for checking work on fixed machines or where work is too heavy to handle. Soft or burnished surfaces are not scratched or marred.

Send your prints or sketches for quotations on Hole Checker unit and sizing plugs made to meet your gaging requirements. Prompt deliveries assured.



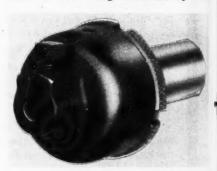
THE AMERICAN GAUGE 125 Bayard St. DAYTON 1, OHIO normal, thereby ensuring uniformity of temperature accompanying through the bath.

temperature to produce uniformly treated work. Moreover, it is claimed that as a result of this design and its temperatures are held to ± 5 deg. F., with the selection of the various operating temperatures easily varied to suit different kinds of work. A variation in the speed with which work is progressed through the furnace is also available by adjustment of the variable speed transmission which drives the two worms that convey the work

When used with Upton preheat and high heat furnaces of similar design. the Upton High Speed Salt Bath Furnace allows for fully automatic heat treating of workpieces. In addition, the salt that coats the work is said to provide protection against oxidation during the short interval that the work is being transferred from high heat to the quenching bath.

### Boyar-Schultz Model 000D Floating Toolholder

Illustrated herewith is the Boyar-Schultz Model 000D Floating Toolholder which is now being marketed by the



Boyar-Schultz Model 000D Floating Toolholder

Boyar-Schultz Corp., 2120 Walnut St., Chicago 12, Ill. Built to withstand long production runs, the holder features a featherweight tool head to assure fast, positive alignment for maximum accuracy in reaming, counterboring, and drilling. The design compensates for



LUERS

### PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips - MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

J. MILTON LUERS. 12 Pine Street, Mt. Clemens, Mich. Produced under License Issued by John Milton Luers Patents Inc.

at and design, h Furce heat on, the to promute or durvork is eat to

loat-

Boyarlholder by the

lholder

nt St.,
d long
ures a
e fast,
m acg, and
es for

г, 1945

unting Bearing Bronze leads its field—and Bunting Distributors are the leaders in their territories. More than 1300 sizes of Bunting Bars, Stock Bearings and Electric Motor Bearings available from hundreds of Bunting Stock-Carrying Distributors. There is one near you and ready to serve you. Ask him for the Bunting Catalog. The Bunting Brass & Bronze Company, Toledo 9, Ohio. BRONZE BEARINGS & BUSHINGS & PRECISION BRONZE

September, 1945

MODERN MACHINE SHOP

misalignment between the turret and the work, thus eliminating the production of bellmouthed holes.

#### Airco No. 315 Welding Electrode

A combination type welding electrode designed to produce horizontal fillet welds with flat or slightly concave profiles and convex fillets in the flat position, as well as satisfactory deep fillet and deep grove welds, is announced by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. Designated as the Airco No. 315, the electrode can be used in welding pressure vessels and their connections, heavy machine weldments, structural assemblies such as trusses, built-up girders and connections, and practically all heavy steel assemblies where high weld quality is essential.

According to the manufacturer, the Airco No. 315 Electrode provides a sturdy, forceful spray type arc. The thick porous slag which completely covers the weld deposits under practically every condition is readily removable. The electrode may be used with conventional technique, employing normal cur-

rents, under which conditions medium penetration is obtained. However, deeper penetration is said to be obtained when the deep fillet technique is used with the high currents recommended for this process.

The Airco No. 315 can, it is claimed, be used for any job that calls for a 6020 or 6030 electrode and may be applied with either alternating or direct current, straight or reverse polarity.

#### Colonial Hydraulic Assembly Presses

As a result of widespread demand for hydraulic presses for assembly work, a line of standardized presses specifically designed for performing a wide range of assembly operations has been developed by the Colonial Broach Co., Box 37, Harper Station 13, Michigan. Of sturdy reinforced steel construction with open side frame design, the presses are available in capacity ratings of 15, 20, 35, and 50 tons. Motors are built in and the direct-acting hydraulic cylinders which operate the rams are built into the heads of the presses.

# GAGE 10 OR MORE DIMENSIONS AS FAST AS 1





This Modern gaging method enables your operators to check complete contours and all dimensions of precision parts as rapidly as usually required for a single dimension. Hundreds of YOUNG Projector Gages are in use daily by leading shops.

No special training needed. Simply place parts to be gaged in holding fixture and the shadowed image formed under high magnification on the screen tells the story. Fast, accurate gaging at low cost will save hours of profitable production time. Standard magnification adjustable to 20-25-30.

Priced at \$175.00 up. Write for illustrated literature. Submit your problems for prompt recommendation. We have a model to fit all inspection needs.

ADROIT MANUFACTURING CO. TA-76 GERRY ST.

edium wever, e obque is econ-

aimed. for a oe apdirect ity.

bly

nd for ork, a fically range n de-Co., higan. uction resses of 15, uilt in inders t into

our all as

unuse ace the

ifiist, of ni-

ed npt all

r, 1945



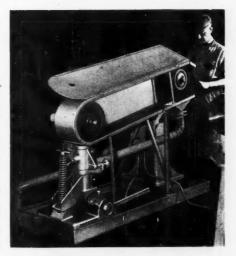
# ABRASIVE - BELT Cattison BACKSTAND IDLER



onverts THE REGULAR GRINDING AND POLISHING LATHE

THE USE OF FACTORY-COATED ABRASIVE BELTS

Many manufacturers have definitely determined the greater efficiency and economy of using abrasive belts over set up wheels. There are fewer rejections due to mild scratches, uniform results, less chance of burning or discoloring, lower polishing cost per piece, as a result of increased production. MATTISON ABRASIVE BELT BACK-STAND IDLER enables you to take advantage of this method at a very small investment. You use your present lathe and set the Backstand Idler in the rear. For complete information send for our new free circular giving complete details.



ROCKFORD - ILLINOIS



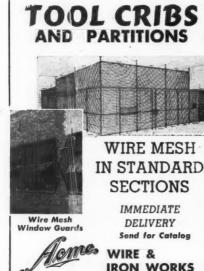
The normal ram speed on the power stroke ranges from 180 inches per minute on the 15-ton press to 60 inches per minute on the 50-ton press. However, ram speeds are adjustable over a wide range to meet the assembly needs of different applications. Ram speed is set by means of a speed control valve located on the right-hand side of the machine column. The return speed of



Colonial Hydraulic Assembly Press

each size machine is constant regardless of its downward speed, ranging from 360 inches per minute for the 15-ton press to 120 inches per minute for the 50-ton press. The maximum stroke of all machines is 12 inches.

The maximum hydraulic pressure range is from 75 to 1,000 lb. per square inch in the 15, 20, and 35-ton presses: the upper range of the 50-ton press is 1,500 lb. per square inch. Accurate control of eperating pressure is provided through a combination hand control re-



ORAN STS., DETROIT 7, MICH.

FORTY-SIXTH YEAR

# STOP DUST with



DUSTKOPS

Require no duct work: Install in minutes.

New style, low cost, spun glass filter, is fire-safe, easy to shake down and seldom needs renewing.

Model 420 for small tool grinders, surface grinders, small wheel buffers, polishers, sanders, etc.

Model 1150 for large wheel grinders and polishers. Has extra large storage drawer for dust.

Two new DUSTKOPS for use on all types of dry grinders, polishers, buffers, sanders, etc. Entirely self-contained with motor driven fan, cyclone separator and filter, DUST-KOPS recirculate cleaned air back into working space.

SEND FOR COMPLETE INFORMATION NOW



AGET - DETROIT CO. 604 First National Bldg. ANN ARBOR, MICHIGAN Phone 2-5585



September, 1945

MODERN MACHINE SHOP

305

egardnging he 15te for stroke

power mines per wever, wide eds of

is set ve loof the eed of

essure quare esses: ess is e con-

ol re-

r, 1945

quiring only a light pressure. Actual operating maximum pressure is adjustable in all sizes of presses by means of a pressure control valve mounted on the face of the machine head, where it is readily accessible to the operator. The control lever of this valve has a knurled knob for easy adjustment. A pressure gage is mounted on the head of the machine immediately above the pressure control knob in a position where the operator has an unobstructed view of it while the machine is running. It indicates the exact pressure being applied to the workpiece at all times and eliminates guesswork in the setting of the pressure control.

Standard machines are available in table heights of 33, 27, and 21 inches corresponding to daylight openings of 18, 24, and 30 inches respectively. Table size of the 15-ton press is 17 x 23 inches; of the 20 and 35-ton presses, 17 x 24 inches; and of the 50-ton presses, 17 x 25 inches. All sizes of machines have a 10-inch throat and an overall height of 85 inches. Floor space occupied by the 15 and 20-ton presses is 27 x 42 inches; by the 35-ton press, 29 x 46 inches; and by the 50-ton press, 29 x 50 inches. The 15-ton press is powered by a 10 h.p.

motor; other machines by 15 h.p. motors.

Standard equipment of all Colonial Assembly Presses includes hand control, pressure gage, and mounting and wiring of the motor. Accessories available include pressure control valve, speed control, and foot pedal control for use in operations where it is desirable for operator to have both hands free.

### Rotorex Precision Tapping Attachment

Applicable to all popular model drill presses, the Rotorex Precision Tapping Attachment illustrated herewith, product of the Douglas Machinery Co., 150 Broadway, New York 7, N. Y.. is designed to produce Class III threads in 0-80 to %-inch sizes with the aid of unskilled labor. According to the manufacturer, the attachment provides positive, automatic control of lead to assure precision tapping, as well as accurate control of depth to a tolerance of 0.010 inch.

Lead screws are hardened and precision ground, well lubricated, and fully enclosed for protection from dirt. Other

Model 25 Hi-Duty Marking Machine

# AVOID RAGGED MARKING!

# ROLL PART NUMBERS ON— QUICKLY AND ACCURATELY!

Requires only a fraction of the applied pressure normally used for stamping—Thus preserving piece parts and adding to the life of your dies.

### RAPID SET-UPS

The economy of rolled markings is self-evident, due to its speed and ease of operation, and Hi-Duty machines are designed by us for practically any marking operation. Have you a tough marking problem? Send us prints or samples of parts to be marked—showing lettering, location and required production—We will be glad to make recommendations.

Designed and Built by



GEO. T. SCHMIDT, INC.

otors.
lonial
cong and
availvalve,
of for
irable
free.

drill pping prod-., 150 s deds in id of manposi-

prefully Other

o as-

s ac-

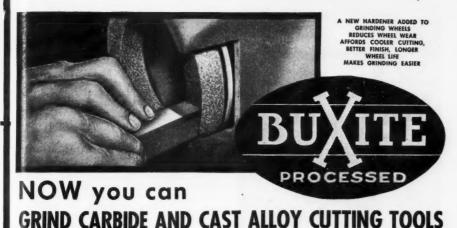
H

for of

nd for ng wad

C. UE





# on BuXite-Processed Abrasive Wheels at 5 to 20 Times Lower Grinding Cost

BuXite — developed through many years of research and brought to completion through the exacting needs of war work — now offered on a national scale — is a method of hardening all types of grinding wheels. The BuXite Process coats the grain of the wheel, and, under the pressure and heat of grinding, this coating changes into a "case" hardening comparable to the hardness of the diamond.

With BuXited wheels, sintered carbide and other superhard metals and alloys can be successfully ground under ordinary shop conditions—and with remarkable economy in life of tools, due to improved finish, cleaner grinding, and elimina-

tion of excess heat. BuXire-Processed wheels grind the shank and the carbide at the same time without "loading"—thus saving extra operations.

BuXite wheels give equally good results on tool steels, cast iron, brass, all metals — in precision grinding, form grinding and snagging. In snagging, the increased production speed which is possible requires less dressing — therefore, you can turn out more work with less effort.

BuXite is now obtainable in all "Bridgeport" wheels. Consult us on your grinding problems. Share in the benefits from this greatest single advance in grinding wheel practice in the last twenty-five years!

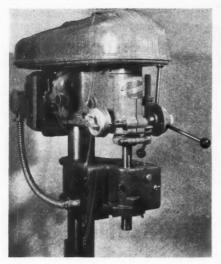
SUXITE -- A DEVELOPMENT OF CONNECTIGUT RESEARCH FOUNDATION IS EXCLUSIVE WITH

THE BRIDGEPORT SAFETY EMERY WHEEL CO., INC., BRIDGEPORT, CONN., U. S. A.

Bridgeport

GRINDERS • GRINDING WHEELS • BUFFING LATHES





cycle, and foot control which allows operator free use of both hands for loading the drill press.

The Rotorex Precision Tapping Attachment can, it is claimed, be installed in one-half hour or less, and the change-over from tapping to drilling or vice versa can be made in 5 minutes. The attachment is said to require slightly more vertical space than an ordinary tapping chuck and is simple in construction and operation.

### Spartan Pipe and Tubing Scraping Tool

The Spartan Tool Co., 6007 Lincoln Ave., Chicago, Ill., announces the introduction of a self-contained power-driven tool for cutting, scraping, or polishing the inside of straight, curved, or fitted pipe and tubing. The unit is designed to house and drive 1/2 inch x 100 feet of flexible steel shafting. The flexible cable automatically coils and uncoils as it is

The driving mechanism comprises a motor-driven head which is removable from its stand. In operation, the driving



Applied an errort to keep our special too those tools returned en effort to keep our special tool vendors in tions: This refers to those tools returned ws oploadrework or replacement becau print specifications. e Atstalled 1 the side ing or feel that major rejec nutes. od bluid the vendor f equire ijus tme to meet blue an an e us to simple to you a necessary jection ction pe ourselves, conneo Consortion ercentage each mon togethe eject1 order to make a minimum. Mill Cladly supply you with any additional innat we have at hand concerning the contents of this
interested in having a perfect record crap-Rejed form letter as we have at hand concerning the contents of this we know you are interested in having a perfect record. for incoln introdriven ishing fitted signed eet of Very truly yours, cable it is PRATT & WHITE ses a ovable riving ears but is also added assurance ISE Many other customers have comthat Vinco will nover lower the ship but this simple, unadorned high standard of workmanship that personifies Vinco Products statistical fact that we are 99.2% right is not only pleasant to our

MILLIONTHS OF AN INCH FOR SALE BY VINCO CORPORATION, EAST SCHICAGO, CERVELAND

Semi-Automatic Hydraulic Spline and Gear Grinder + Optical Master Inspection Dividing Head + Invalute Checker + Angle Tangent to Radius Dresser

\* Index Plates + Presision Vises - Sine Bars - Straight side Spline, Serration Spline, Invalute Spline and Helical Spline Plug and Ring Gages - Thread

Plugs, Rings and Setting Plug Gages - Spur and Helical Master Gears - Munition Gages + Propeller Hub Gages - Builturp and Special Gages - Gear

Radius Fistures - Spline and Index Fistures - Hydraulir Power Control. Utilization and Distribution Units - Engineering, Design and Development.

, 1945



Spartan Pipe and Tubing Scraping Tool

unit is held at the opening of the pipe or tube so that the desired length of flexible rod may be fed into the pipe.

For removing waste material or scale, the flexible rod is equipped with elyptical shaped spring steel cutter heads of the type shown in the accompanying illustration. The normal speed of these cutter heads is 300 r.p.m. The flexible shafting enables the cutter head to be directed through bent tubing or pipe containing a series of fittings. When the cutter head encounters resistance from an obstruction within the cylindrical opening, the effect of the flexible rod is to store up energy until the accumulated torque overcomes the resistance, and the release of such a torque load causes the cutter to be spun at a speed of approximately 750 revolutions per minute.

The Spartan Pipe and Tubing Scraping Tool is said to be particularly useful in maintaining open drain pipe. It can also be used for cleaning watertube boilers, flues, steam risers, and other process plant piping.

#### "Dustkop" Model 420 Dust Collector

Featuring a cyclone separator, a completely self-contained portable dust collector of the recirculating type for use with grinders, sanders, abrasive cut-off

## The ATLAS Precision Universal Joint

Balanced Heat-treated Parts



Made from Alloy Steels. All parts accurately ground. Can be supplied in Bronze.

Write for Circulars

GRAY & PRIOR MACHINE CO.

On the West Coast write to Link Belt Co., located in San Francisco, Oakland, Los Angeles,
Pertland and Seattle.

anying
f these
flexible
to be
r pipe
len the
e from
ndrical
rod is
cumustance,
e load
speed
speed

Scrapy useipe. It water-, and

comst color use cut-off HEAT TREAT
SMALL PARTS
In Your Own Plant

Save time and money when you have breakdowns or bottlenecks by heat treating small parts in your own plant with a Cooley Muffle-Type Electric Furnace. Used in hundreds of small and large plants, they serve in emergencies for heat treating breakdown repairs and in production for hardening, drawing and annealing tools, dies and troublesome small parts. Cooley Furnaces are ideal for industrial plants, tool and die shops and

# More Profitable Reasons for Using Cooley Furnaces

metallurgical laboratories.

1—Hardening, drawing and tempering small batches in large furnaces is uneconomical.

2—Small parts can be normalized and annealed quickly and easily.

3—Convenient for pre-heating prior to high-speed hardening.

4—Always available to handle emergency repair work without delay.

5—Use as a pilot furnace to predetermine techniques for production heat treating.

### **AVAILABLE IN TWO SIZES**

Туре	Chamber Capacity	Amps 115 V	Watts	Amps 230 V	Price
MH-3 MH-4	8"W 6"H 14"L 10"W 6"H 18"L	29.6	3400 4800	14.8	\$124.00° \$191.00°

\*Includes Hearth Plate

MAX. SAFE TEMPERATURE—Continuous operation, 1750° F.; Intermittent operation, 1850° F.

AUTOMATIC CONTROL—Indicating Controlling Pyrometer—Thermo-couple and lead wire complete—\$152.40.

### NO SALESMEN WILL CALL

Ask for free information and ordering instructions so you can make your own decision and determine your own requirements. Write for Bulletin No. 50 today—no obligation.



### COOLEY ELECTRIC MANUFACTURING CORP

34 South Shelby Street Indianapolis 7, Indiana Export Department, 1111 S. Ferry Building, New York 4, New York



Quick-acting production booster for punch presses, drilling, reaming, tapping, screw and milling machines. Brass body, hardened steel cam and operating finger. Light puff to full blast, positive control. Write C. A. Norgren Co., 220 Santa Fe Drive, Denver 9, Colorado.

Norgren



The "SHUR-GRIP" holds round, flat or rectangular parts - the latter in vertical or horizontal positions. Vise jaws contain grooves for holding rounds up to 2" in diameter, are of hardened steel, 5" wide and

The "SHUR-GRIP" cuts drilling set-up time 75% to

Send for illustrated bulletin and price list NOW! Address Dept. 00.

### N TOOL COMPANY

AS MASSAUUT AVENUE, TAST PROVIDENCE TS. A.

machines, polishing lathes, and so on. has been added to the line of "Dustkop" dust collecting equipment marketed by the Aget-Detroit Co., 602 First National Bldg., Ann Arbor, Michigan.

Designated as the Model 420, the unit also features a motor-driven multipleblade fan, large dust storage bin, and flat spun glass filter, all contained in a single all-steel fire-safe unit. The spun glass filter can be "shaken down" quickly as required with a crank provided on the unit. When necessary, the



"Dustkop" Model 420 Dust Collector connected to a pedestal type grinder

filter material can be readily renewed. Dust and dirt-laden air drawn in from the source first enters the cyclone separator where most of the dirt is removed. The flat filter, which comprises the entire top of the Dustkop, removes the balance of dust and dirt, with the clean air being returned to the working area. Measuring 12 x 22 x 24 inches high, the Model 420 can be placed in an extremely limited space behind or beside a grinder. The unit can be readily installed without tools by merely slipping flexible metal hose (usually 3-inch diameter for double-wheel grinders up to 6-inch diameter) onto the inlet sleeves stkop" ed by tional

e unit
Itiple, and
I in a
spun
Iown"
proy, the

on-

wed.

sep-

ises

the king

ches an bedily slipnch up eves Idaptable to All ision Boring Opera ETLAULI ROUND TOOL BITS FITTED DIRECTLY INTO BAR - NO **BUSHINGS REQUIRED OPENINGS FINISHED AFTER** HARDENING, INSURING **GREATEST ACCURACY OF FIT** FOR TOOL BIT WETMORE POSITIVE WEDGE-LOCK HOLDS TOOL BIT RIGIDLY AND ELIMINATES VIBRATION \* SIMPLICITY OF PARTS IN-SURES EASY REPLACEMENTS \* Write for WETMORE Catalog

September, 1945

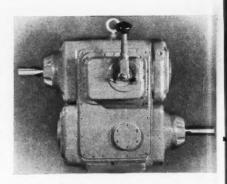
MODERN MACHINE SHOP

of the dust collector and connecting the hose to the dust outlet of the grinder.

The dust storage compartment is the size of the entire base of the unit and is readily accessible for emptying through a plate on the front of the collector. Power to provide the suction (which is rated at 420 c.f.m. with a 1-inch static suction in a 5-inch pipe) is supplied by a multpile-blade fan driven by a ¼h.p., continuous duty, 3,450 r.p.m. motor, which is available for operation on practically any 60 cycle power supply. Access to the motor for oiling or inspection is afforded by the open-back design of the collector.

### Portman Model HT-1 Hydraulic Variable Speed Transmission

Manufactured by the Portman Machine Tool Co., 70 Portman Rd., New Rochelle, N. Y., the Portman Model HT-1 Hydraulic Variable Speed Transmission illustrated herewith is of the heavy duty type and is intended for use as a variable speed drive unit for all types of industrial applications requiring continuous duty performance



Portman Model HT-1 Hydraulic Variable Speed Transmission

under varying conditions of load and speed. Infinitely variable speeds are instantly available from zero or full neutral position to maximum motor speeds both forward and reverse. Torque output is said to remain constant at all speeds. In addition, the transmission is claimed to offer extreme flexibility of control under all operating conditions.

The Portman Model HT-1 Transmis-

### **Troyke Rotary Tables**



Sizes 9", 12", 15", 18"

Ask your dealer or write us for eight page catalog.

ALFRED A. TROYKE

4422 Appleton St. Cincinnati, Ohio

### Why THOR STAMPS Last Longer



... because they're made of a special, correctly - heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

The Pittsburgh Stamp Co., Inc. 812 CANAL ST. PITTSBURGH, PA.

# MARKING MACHINES

STEEL DIES-TYPE AND FIXTURES

Matthews marking machines, dies, type and fixtures supplied for marking names, codes, trade names, trade marks, patent numbers, etc., on all types of industrial parts or products.

Write for literature



ble

al, ral rkisy

nd

C.

1945

and are full notor or que at all on is cy of ons.

Flat Die for Marking Round Parts



Round Die for Marking Flat Parts





Roller Die with Interchangeable Type



JAS. H. MATTHEWS & GO.

3944 FORBES STREET

BRANCH

NEW YORK BOSTON CHICAGO

PITTSBURGH 13, PA.

PHILADELPHIA NEWARK SYRACUSE

District Sales Offices: Cleveland, Hartford, Birmingham

September, 1945

MODERN MACHINE SHOP

### ARTUS ARBOR SPACERS



### The COLOR tells the THICKNESS

**ARTUS Arbor Spacers** made of plastic in various colors identify thickness at a glancel .001, .0015, .002, .003, .005, .019-.030. Speed up accurate fit-

### CONVENIENT TRIAL OFFER

### **Handy Spacer Assortment**

10 eg. .001 — .0125 thick 5 ea. .015 - .030 thick 100 SPACERS IN ALL

- \$2.80 11/4" - \$3.40 11/2" 3.00

Other standard sizes also available.

Illustrated Folder Free. **immediate Delivery on** Spacers, Gaskets, Shims

**Industrial Products Suppliers** Dept. M, 106 Water St., New York 5, N. Y.



Cutters of proven quality. Standard sizes in stock for immediate shipment. Special cutters made to blue print specifications.

Write for Folder. Full information and prices on **KEO** Keyseat Cutters and Lathe Mandrels.



19326 Woodward

Detrait 3 Mich.

sion can be obtained with various types of control mechanisms in addition to the hand lever shown to suit a wide variety of applications, including remote control stations. Compactly constructed, the unit measures 8½ inches wide x 16¾ inches high x 18½ inches long overall (excluding shaft). The shaft is 1% inches in diameter and has an extension length of 31/2 and 41/2 inches. Horsepowers available are 5, 71/2, 10, 15, 20. The maximum speed of the unit depends upon the speeds of the electric; drive motors or other prime movers used and such speeds are rated up from 900

to 1,700 revolutions per minute.
In addition to the individual unit type construction illustrated, the transmission can also be obtained complete with electric drive motors for various electric current specifications and with a base for mounting the unit and the electric motor, starters, and controls suited to the particular application.

#### Producto Universal Drill Jig

Designed for use in drilling holes in round shafts or spindles and in some cases in drilling square or rectangular parts, the Producto Universal Drill Jig illustrated herewith, product of The



Producto Universal Drill Jig

Producto Machine Co., 960 Housatonic Ave., Bridgeport 1, Conn., includes two hardened and ground V-jaws that allow for the accommodation of a wide variety of work diameters. In addition, the jig includes bushing plates that are designed to accommodate a wide range of drill bushing sizes. The construction of the unit affords a quick method for lo-

types on to wide g reconinches inches shaft as an nches. 10, 15, nit delectric s used

t type nsmise with elecvith a d the ntrols

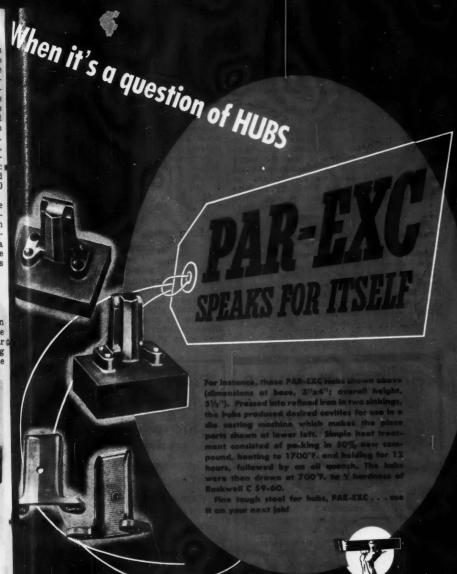
m 900

ig les in some ngular ill Jig

atonic es two allow ariety he jig re denge of ion of for lo-

r, 1945





# Vanadium-Alloys Steel Company

LATROBE, PA.

Colonial Steel Division · Anchor Drawn Steel Co.

cating the drill bushing plate bracket for drilling a hole at any point within

the length of the work.

The base of the Producto Universal Drill Jig consists of a semi-steel casting with accurately machined and ground surfaces for locating the bracket that holds the interchangeable drill jig plates by means of a T-slot and V-grooves. Within the base is a hardened and ground steel V-jaw into which is fitted a smaller removable hardened and ground V-jaw for handling smaller work. A bracket with adjusting screw acts as a stop for accurately locating the work for drilling. The jig bushing bracket is also fitted with a screw for tightening the work during the drilling operation.

The Producto Universal Drill Jig is standardly furnished with four interchangeable jig bushing plates with holes of 16, 1/2, 3/4, and 1-inch diameter to accommodate standard drill jig bushings. General specifications of the unit are as follows: Overall length of base, 12 inches; width, 6 inches; overall height, 5 inches; capacity, 1/4 to 2-inch diameter shafts inclusive; sizes of drills accommodated, No. 70 up to 34-

### Zenith Super Flux

Said to be ideal for soldering electrical connections, the Zenith Super Flux now being marketed by Polan Industries, Huntington 19, W. Va., is described as completely non-corrosive. The material is likewise recommended for use as a soldering flux on copper, cadminum plated brass and steel, and black steel and to facilitate the thinning of soldering tips.

According to the manufacturer, Zenith Super Flux can be easily applied by brush or dipping and readily adheres

to the work.

### Lanco 4-Inch Semi-Receding 6-Chaser Die Head

Development of the Lanco 4-Inch Semi-Receding 6-Chaser Die Head illustrated herewith is announced by the Landis Machine Co., Waynesboro, Pa. The head has a capacity of from 21/2 to 4-inch pipe size, this range being covered by chaser holders mounted on slides of heavy cross section to assure maximum rigidity. The chaser holder



This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x361/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING-WRITE TODAY

WALLS SALES CORP. 96 Warren St., New York, N. Y

### Regarding INDUSTRIAL DIAMONDS

lirst, use good diamonds, properly set.

Lollow with proper usenot abuse.

KOEBEL Diamond Tools and Koebel literature on diamond care are designed to provide maximum value from your tools. Write for details.



KOEBEL DIAMOND TOOL CO. 9450 GRINNELL AVENUE, DETROIT 13

# ENGINEERED

Live Centers

Standard shanks with Morse. tapers carried in stock ... send us your specifications and blueprints ... we will see that your job is set up with the right LIVE CENTER.

EASE SEAL

SHANK

LARGE THRUST BEARING \_

LARGE RADIAL BEARING -

CUSHION ACTION -

GROUND TRUE with BEARINGS -

# **STURDIMATIC** OMPA

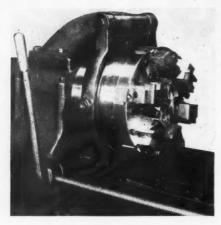
DETROIT, 2 MICH. THIRD AVE.

ectri-Flux ndusde-1 for cadblack ig of

enith d by heres

q Inch d ilthe

21/2 eing d on sure older :



Lanco 4-Inch Semi-Receding 6-Chaser Die Head

slides are gibbed to the head body to provide compensation for wear. The interlocking design of the holder and slide is said to assure a rigid clamping action of the two mating parts with only one clamping screw.

The Lanco Semi-Receding Die Head

employs chasers that provide an accurate and rapid method for interchanging and setting. The head is of the internal tripped type in which a 6-blade insert blade type reamer located within the bore of the head reams and chamfers the pipe during the threading operation and opens the head at any predetermined thread length. The semi-receding action of the head is said' to eliminate the possibility of any chaser leave-off marks on the thread as the head opens. The reamer is adjustable by a rod which extends through the machine spindle. Any desired thread length can be obtained by merely releasing the locking rod and turning the adjusting rod right or left to increase or decrease the thread length.

All parts of the Lanco 6-Chaser Head are made from either high carbon or special alloy steel, depending upon their function, and are heat treated or case carburized and precision ground to assure maximum accuracy and long wearing quality. All parts of the die head are thoroughly protected against wear. Zerk type fittings provide a means of forcing heavy grease into the chaser slides and other operating parts for lubricating purposes and also act as a





320

OIL

(.00

and

#### FIRST NAME

**Powdered Metal Bearings and Machine Parts** 



OILITE BEARINGS weighing from 1/10,000th (.0001) of a pound to 224 lb. in bronze, iron and Super-Oilite.

ur-

nal ert the ers ion ering ate off ns. ich lle. obing ght the ad or on or nd

ng die nst ns ser for

15

OILITE MACHINE PARTS offer pyramided sconomies, technical advantages, broader scope in designing.



OILITE FILTERS for filtering liquids and gases are made in a broad range of metering shapes and sizes.



OILITE BARS AND PLATES are indispensable for maintenance, small quantity requirements, experiments.

#### CHRYSLER CORPORATION

AMPLEX DIVISION

DETROIT, MICHIGAN

Representatives and stocks located at industrial centers in United States and Canada





GEO. T. SCHMIDT, INC.

1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS

Designed & built by

seal to prevent entry of fine cuttings and dirt. While the die head is designed primarily to operate as an internally tripped unit, it can be opened and closed externally by means of an operating yoke.

#### Elox Metal Disintegrator

Said to disintegrate metal at least three times faster than the previous model as a result of a new operating



Elox Model I Disintegrator

head, the metal disintegrator now being offered by the Elox Corp., 838 Maccabees Bldg., Detroit 2, Mich., is available in three types designated as the Models I, J, and G.

The Model I is a cabinet type which can be moved around the shop on casters and is completely self-contained. The Model J is a compact, streamline, bench type unit having a circulating pump and can be used in performing any operation in the same range as the larger Model I. The Model G, which is

a

## Rickert Shafer Shafer





R-S Adjustable Boring Head



R.S Model "C" ic Self-opening Die Head

ngs de-

inned an

ast ous ing

e

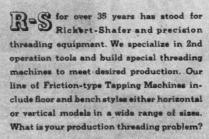
h

i.

R.S Model "T"
Die Head for Toper Threading



R-S Model 'BR' Collapsible Tap





R-S Model "F"
Automatic Die Head

BICKERT-SHAFER CO · ERIE, PA.

TE HEADS . COLLAPSIBLE TAPS . BORING HEADS APPING MACHINES . SPECIAL THREADING MACHINES

the smallest unit, embodies all of the characteristics of the former Model E plus faster cutting features. This model is said to be ideal for intermittent use in small shops. A special water supply is required in operating the unit. All models can also be used in drilling standard or odd-shaped holes in hardened steel.

#### Ideal Granite Surface Plate

Accuracy to 0.0001 inch when gaging points, laying out drill jigs, dies, and fixtures is said to be possible with the granite surface plate now being marketed by the Ideal Commutator Dresser Co., 1031 Park Ave., Sycamore, Ill. Made of Vermont granite which is ground and lapped to precise tolerances, the plate is described as non-warping since all internal stresses are said to have been relieved. In addition the accuracy of the plate is said to be unaffected by scratches or nicks. Moreover, the plate is claimed to have a low coefficient of friction, thus enabling tools and fixtures to be moved over the surface with ease.

Rustproof and non-magnetic, the Ideal



Ideal Granite Surface Plate in Use

Granite Surface Plate is available in a wide range of sizes from 8 x 10 to 30 x 72 inches. Larger sizes can be obtained on special order. All plates are of uniform cross section and, it is claimed, will not change shape or accuracy with variations in temperature or with age.



TYPE HOLDERS AND TYPE ROLL MARKERS . HAND STAMPS LOGOTYPES DIES STANDARD AND SPECIAL STAMPS INSPECTORS' STAMPS MACHINE ENGRAVING PRECISION DUPLICATING

NEW METHOD STEEL STAMPS, Inc. 149 Joseph Campau, Detroit 7, U.S.A.



#### STEELGRIP BELT LACING

Astrong lacing for all types of belts. Put on with a hammer in a few minutes, Clinches smoothly into belt, compresses ends, prevents fraying. 2 - piece hinged rocker pins provided, 11 sizes. In boxes, handy packages, cartons and long lengths.

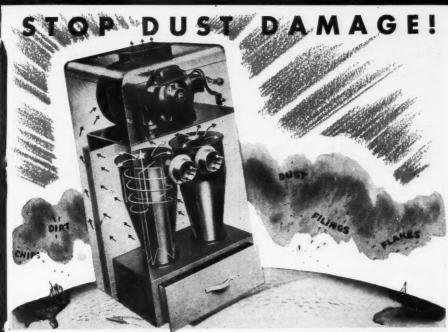
Write for catalog sheets.



## WIREGRIP

#### ARMSTRONG-BRAY & CO.

"The Belt Lacing People" 5346 Northwest Highway, Chicago 30, U.S.A.



#### PROTECT

## Health and Promote Safety with IDEAL DUST COLLECTOR

Easily installed on any machine— Inexpensive . . . Powerful . . . Twin Cyclone Separators

Powerful suction removes dust and abrasive particles from grinding, buffing and other machining operations. Safeguards workers' health. Air passes through twin cyclone separators and a filter, assuring thorough cleaning.

Portable. Easy to install. Compact. No need to relocate machinery. Accessories available for adaptation to various machines.

#### PROMPT DELIVERY

Mich Committator Bassist CO 1031 Park Ave., Sycamore, III.

IDEAL Sycamore

Over 100 Products To Help Machinery Serve You Better

#### NEW IDEAL Lathe CHUCKS

Independent and Universal Types

- Easily adaptable to any lathe.
- Jaws hardened and ground. 2 sets—Internal and External Type.
- Cast Adapter with each Chuck.
- LOW COST -High Precision.

Other IDEAL Machine Tool Products Include:

Demagnetizers, Live Centers, Tachometers, Metal Etchers, Grinding Wheel Dressers, Balancing Ways, Granite Surface Plates.

WRITE FOR FREE IDEAL MACHINE TOOL CATALOG

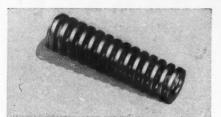
n a ned iniied, rith .ge.

rith hat

ook in-

her

Aa-



## DANLY

MEDIUM PRESSURE
HIGH DEFLECTION
HIGH PRESSURE
MEDIUM DEFLECTION

#### DANLY MACHINE SPECIALTIES, INC.

2100 South 52nd Ave., Chicago 50, Illinois Milwaukee • Detroit • Cleveland • Dayton Rochester • Philadelphia • Long Island City Ducommun Metals & Supply Co., Los Angeles



#### Thriftmaster Offset-Type Adjustable Drill Head

Thriftmaster Products Division of Thomson Industries, Inc., 29-05 Review Ave., Long Island City 1, N. Y., announces the augmenting of its drill head production by a two-spindle offset-type drill head in which one spindle is built integral with the drive shaft and the



Thriftmaster Offset-Type Adjustable Drill Head

other is offset and adjustable for variable centers.

Of full ball bearing construction with all vital parts completely enclosed and operating in grease, the Thriftmaster Offset-Type Adjustable Drill Head is available in three standard sizes having spindles with '4-inch capacity chucks with Nos. 1 or 2 Morse tapers.

#### Kennametal Lathe File

Said to retain the advantages of previous models in that it is designed to cut hard steels in a minimum of time, the lathe file now being marketed by Kenametal, Inc., Latrobe, Pa., includes blanks having brazed-on nuts that are attached to the lightweight aluminum

just-

eview
, anl head
t-type
built
d the

rill

vari-

with

and

aster d is

ving

ucks

orev-

the Kenudes

are

1945

H(f))

#### SPHERICAL BEARINGS

AND

#### SPHERICAL BEARING ROD ENDS

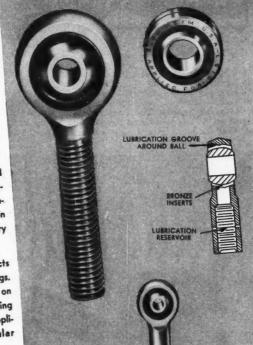
Here is the new Heim Bearing where one ball does the work of many. Engineered and built on an entirely new principle, this new mono-ball bearing has as much freedom of movement as the yolk in an egg.

Contact area is large with provision for mis-alignment in all directions, and providing for maximum radial and thrust loads.

The Heim Spherical Bearing and Rod End Bearing has been timetested under the most severe conditions in millions of installations in Army and Navy planes of every size and description.

There is a place in your products for these Heim mono-ball bearings.

Our new catalog will be sent on request, or write our Engineering department for suggested applications to fit your particular product.



THE HEIM
FAIRFIELD



COMPANY

alloy handle by means of screws. In this manner, the file blanks can be readily replaced when worn.



Kennametal Lathe File

The Kennametal Lathe File is available with two types of blanks—fine (30 teeth per inch) and coarse (20 teeth per inch)—which are interchangeable on the same handle. The handle grip is shaped to fit the hand and has a thumb rest and knuckle guard. An extension

beyond the filing surface affords a convenient finger hold on the tool, and a hole provided in this extension permits the file to be hung up when not in use. The tool measures 13½ inches long overall and has a filing surface ¾ inches wide x 8 inches long comprising two ¾ x 4-inch Kennametal blanks.

#### LeMaire Special Vertical Drilling and Boring Machine

A vertical drilling and boring machine for cutting 24 holes in an extremely heavy gun part has been announced by the LeMaire Tool and Manufacturing Co., Dearborn, Mich. The machine is equipped with a 25-spindle drill head and a special 3-position hydraulically actuated shuttle-index table on which the part is loaded in a fixture.

After being loaded in the front position, the part is moved into the second position in order to have 20 holes of various diameters drilled into it. The part is then moved to the rear or third position where 4 more holes are drilled and 1 hole is reamed. The bushing plate



a conand a permits in use.

rilling

achine remely ced by turing ine is head lically which

posisecond les of The third drilled plate

1945

s long ace ¾ prising nks.



YOU'LL HAVE A LARGER GAGING SURFACE WITH THE NEW ROUND GAGES

## SIROM

When you use the new Ellstrom round gage blocks, practically all of the gaging surface can be utilized because there are no corners, as in the case of the square blocks. For example, the gaging area of a round block is .9970 square inch while the gaging area of a square block is .7917 square inch. Gage life is thereby increased.

Chromium plating increases gage life many times over ordinary steel gage blocks.

Use of the round shape gage virtually eliminates chances of tipping, causing possible injury to the gaging surface. "Flats" prevent rolling.

#### NOTICE

... We offer immediate delivery on rectangular gages.



CHROMIUM

PLATED

MINISTER STATES	DANGE COLOR
Set No. 2-85-W	\$464.00
5ol No. 2-85-1	695.00
Set No. 2-81-W	437.50
Set No. 2-31-1	656.25
Set No. 2-35-W	222.50
Set No. 2-35-1	318.75
Ser No. 2-36-W	259.35
Set No. 2-36-1	373.75
(Prices on Individual block	s on request)

DEARBORN GAGE CO. 22035 BEECH STREET DEARBORN, MICHIGAN

inators of Chromium Plated Gage Klocks



LeMaire Special Vertical Drilling and Boring Machine

on the drill head is equipped with a special coolant valve and partition to allow coolant to be directed either to the front or to the rear working position when the machine is in operation.

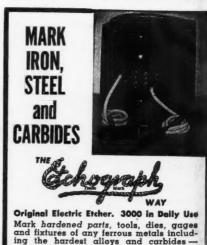


#### G-Sol 195 Safety Solvent

Designed with particular attention to factors of safety, non-corrosiveness and solvency range, G-Sol 195, a safety solvent for use in cleaning precision bearings, instrument parts, typewriters, and similar mechanisms where both grease and oil gums are troublesome, has been announced by the Gaybex Corp., P. O. Box 3, Nutley 10, N. J. Water white and characterized by & high flash point and freedom from elements of toxicity and corrosion, the solvent is said to provide parts thus cleaned with unusual resistance to rust, fingerprints, and other types of stains. Available in 5 and 54-gallon drums.

#### "Dustkop" Vapor Collector

A unit for collecting oil and cutting fluid vapors arising from cutting, grind ing, and similar operations has been added to the line of "Dustkop" collecting equipment marketed by the Aget-Detroit Co., 602 First National Bldg. Ann Arbor, Mich. The unit is intender for use with virtually any type of high speed production machine tools employ



ing the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements. • Also a combined Etchograph and Demagnetizer.

Write for circulars and prices.

BREWSTER-SQUIRES CO. Hudson Terminal Bldg. New York 7, N. Y. t

ction to reness safety ecision to reiters, both esome, aybex N. J. by & m. ele-h, the stains. etc.

utting grind been ollect

Aget.
Bldg.
ender
f high

Use ges ududeet ned

## This tkinner Blade cuts down metal waste



Only .032" thin, the blade in the Johnson Metal Cut-off Bandsaw cuts straight and true—and economically. Loss of expensive metal is held down to less than 3/64" per cut! That's performance that makes sense and savings.

#### Other Important Johnson Features

- 1. 3-point base insures even cuts
- 2. Box type frame protects movable parts
- 3. Four speeds provide right speed for every metal, hard or soft
- 4. Hydraulic control insures even pressure throughout cut
- 5. Coolant attachment minimizes friction, prolongs blade life
- 6. Automatic shut-off after cut is completed

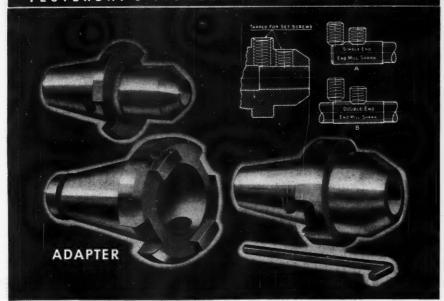
WRITE TODAY FOR FULL DETAILS

## JOHNSON MANUFACTURING CORP.

5000 CHRYSLFR BLDG.

NEW YORK 17, N. Y:

#### YESTERDAY'S PIONEER . . . TODAY'S LEADER



#### WELDON Adapter and End Mill Holders

To speed production and insure precision cutting, WELDON originated the type of Adapter and End Mill Holders shown here. The Holders grip the end mill with absolute rigidity to give positive drive without "chatter" or "run-out". The Adapter permits quick and easy change from one size holder to another without loosening the spindle draw bar. Accommodates



both single and double end mills in shank diameters of seven sizes. These are stock items designed and built to the WELDON quality standard.

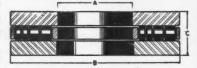
Insist on WELDON TOOLS FOR WELL DONE JOBS.

Write for Catalog 8-B.





## -GMILLIAM





TYPE RT

#### ROLLER THRUST BEARINGS

 Made with flat seats and in a variety of self-aligning types.

There have no appeared for

These bearings are especially adapted for heavy loads at slow or moderate speeds.

Standard sizes are shown in our general catalog, sent upon request.

#### THE GWILLIAM CO.

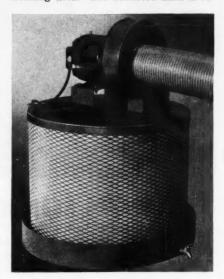
358 FURMAN ST.

BROOKLYN, N. Y.



ing cutting oils or coolants such as screw machines, thread grinders, centerless grinders, wet carbide tool grinders, and so on.

The Dustkop Vapor Collector utilizes a motor-driven multiple blade fan to provide a suction to draw the vapor from the vicinity of the operator and the work. The vapor-laden air is directed against the inside surface of a spun glass filter material where the vapor condenses and is collected in a pan, the cleaned air being recirculated into the working area. The collected fluid is re-



"Dustkop" Vapor Collector

turned to the sump or reservoir of the machine tool through a faucet provided on the pan.

Having a suction capacity rating of 500 c.f.m., the collector can be readily installed using either ordinary sheet metal pipe or flexible metal hose of 5-inch diameter which fits the inlet flange of the unit and can be located near the source of the vapor. Usually, the collector is mounted immediately behind and above the area of the work so that it not only is in the best possible location for collecting the vapor but also for providing the easiest means of returning the fluid to the sump or reservoir of the machine.

The standard motor used to drive the fan and to provide the suction is a 1/3



FREE SURFACE SPEED TABLE CHARTS

in Wall size and Pocket size. THESE CHARTS show at a glance—table of speeds, feeds and proper tool selection, whether you use high speed steel, TANTUNG, or cemented carbide.

The Vascoloy-Ramet standard of quality is reflected in lower overall machining costs when you use Tantung or Tantalum/Tungsten Carbide Tools.

comparison the world's finest carbide.

4529

#### VASCOLOY RAMET CORPORATION

NORTH CHICAGO, ILLINOIS . DISTRICT SALES AND SERVICE IN PRINCIPAL CITIES

as ter-

ers.

or the ted oun por the the re-

he

ed

of ly

et 5-

ge he ol-

at

aot nir

15

h.p. 3,450 r.p.m., continuous duty type for operation on 220 volts, 3 phase, 60 cycle alternating current. Units for operation on power sources of other voltages and frequencies can be obtained on special order.

radial drills, and drill presses is now being marketed by the Invincible Tool Co., 3160 Empire Bldg., Pittsburgh 22, Pa. The accompanying illustration

#### Invincible 90-Degree Adapter Head

An adapter head for working at 90 degrees or right angles to the spindles of vertical milling machines, jig borers,

## NAME IMPLIES

TRU-CUT engineers have combined the sound fundamental of metallurgy with an advanced degree of skill in developing a new heat treating process of high speed steels, resulting in one of the greatest machine tool efficiency changes in tool history

Tool Bits • Center Drills Key Seat Cutters • End Mills Milling Cutters • Form Tools

Write for Illustrated Catalog

FEW TERRITORIES OPEN



14236 BIRWOOD AVE.

Detroit 4, Michigan



Invincible 90-Degree Adapter Head

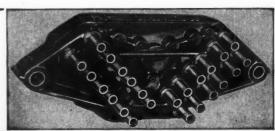
shows the adapter as made for use on Gorton, Bridgeport, Knight, and other makes of vertical millers or jig borers. By changing adapters, horizontal millers can be quickly and easily converted into vertical milling machines.

The Invincible 90-Degree Adapter Head shown herewith is designed to accommodate end mills with No. 7 Brown & Sharpe or No. 2 Morse tapers. Adapters for accommodating end mills with other tapers can also be obtained. In addition, adapters are available in

Pictured: a 24-Spindle Heavy-Duty Drill Head.

DESIGNERS AND MANUFACTURERS OF MULTIPLE DRILL-ING EQUIPMENT.

We invite your inquiry.



MICHIGAN DRILL HEAD CO. 971 E. 8-Mile Read, Hazel Park, Mich.

## FULFLO FITS INTO YOUR CONVERSION PLANS

TIME now to include FULFLO Coolant Pumps and By-pass Valves into your reconversion line-up of time, labor and cost-saving equipment.

Write for Fulflo Mechanical Data Book giving you complete data with mechanical drawings. Model AG3M Coolant Pump

#### **FULFLO COOLANT PUMPS**

Pipe sizes from 3/8" to 11/2". Patented seal, splash-proof, ball-bearing motors.

## FULFLO BY-PASS, OIL-RELIEF VALVES

Pipe sizes  $\frac{1}{4}$ " to 2". Chatterless. For pressures from 0 to 350 lbs.





Specialties Co., Inc.
BLANCHESTER, OHIO

very small sizes in single or double angles for trimming fins and flashes, burring or countersinking jobs on die castings, plastic molded or bearing parts, and so on.

Larger sizes can be built to order for use on large radials or horizontal boring mills in both single or double 90 or 45-

degree angles.

#### Tufcrete Resurfacer

A material for patching or resurfacing wood, concrete, brick, asphalt, stone, and other types of indoor or outdoor floors, to be known as Tufcrete Resurfacer, is now being marketed by the Tufcrete Co., 625 S. W. Ninth St., Des Moines 9, Iowa. The material can also be used in repairing platforms, ramps, reservoirs, tanks, and so on.

Tufcrete Resurfacer can be applied without the chipping of ruts or holes or the use of heat. According to the manufacturer, the material will not shrink crack, or pull away from old surfaces or edges and can be troweled to a feather edge to endure heavy, continuous traffic. It is said to be fire-resisting and to originate no odor or dust.



Zagar Soft Collet Blanks

Zagar Soft Collet Blanks

Zagar Tool, Inc., 23880 Lakeland Blvd., Cleveland 17, Ohio, announces the availability of Nos. W. & S. and 5-C types of blank collets in soft condition to fit standard collet attachments. The col-

## The COLBORNE Speed Lather

## SPEED UP FINAL OPERATIONS ON DIES • GEARS • SCREWS • LONG RODS



A recent addition to the COLBORNE line of Speed Lathes is the Series 30 machine. This speed lathe is indispensable for economical polishing, grinding, burring and lapping. Very compactly constructed to do highest quality work with the COLBORNE features of spindle

Very compactly constructed to do highest quality work with the COLBORNE features of spindle bearings running in oil, instant stopping brake, easy opening collet and standard speeds of 600-920-1720-3280-4800 RPM using 3/4 H.P. motor and cone pulleys. Collets and chuck may be used.

For more production per day choose COLBORNE.

PROMPT DELIVERIES

Write for Details Today.



## COLBORNE MFG.

Builders Since 1879
157 DIVISION ST. CHICAGO, ILL.

336



#### YOUR PUNCH PRESS -

Works more hours each shift with a Feed attached to each Die

Set-up time for both feed and die is no longer than for die alone. With either the Dickerman Hitch Feed or Die Feed, the first cost is so low that you can easily have one for each of your frequently-used dies.

## 74. E. Dickerman Mfg. Co. 321E ALBANY STREET SPRINGFIELD, MASSACHUSETTS



SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments... no bearings, friction, heat or loss of power. Instant release without stopping lathe.

Two-inch capacity, now only \$145 One-inch capacity, \$95 Round, square or hex collets, plain—serrated

HALL MANUFACTURING COMPANY 622 Tularosa Drive • Los Angeles 26, Calif.



Standardized Die Sets, embodying many exclusive features, a listing of more than 195,000 stock sizes and 46 different styles afford a service that is unsurpassed.

Send for Our New Catalog

E. A. BAUMBACH MFG. CO.

1806 S. Kilbeurne Ave.

Chicago, III.

lets are machined all over except for the holes which can be bored by the user to meet his own particular requirements. Special instructions are included with the collets for annealing, split with a rubber wheel and spring.

#### Gelber Static Balancer

Adaptable for use where rotating parts must be put in static balance, a unique precision-built static balancer of unusually compact, portable construction is now being offered by Samuel S. Gelber, 34 S. Jefferson St., Chicago 6,

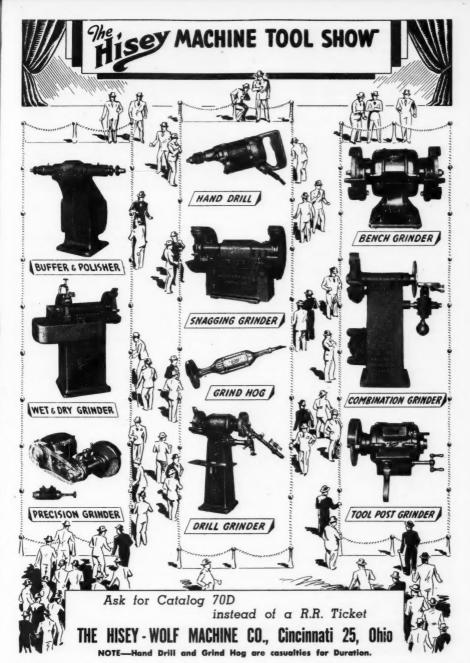


Gelber Static Balancer

Ill. The 9-inch model illustrated herewith is provided with a finger-tip span adjustment of up to  $9\frac{1}{2}$  inches and can be readily set up on practically any fairly level support.

The balancing surfaces are provided with built-in spirit levels and fine adjustment screws which permit ready compensation for high or low spots in the bench or supporting surface. The balancing surfaces are deep hardened and include accurately ground ways for extreme sensitivity and elimination of friction. The supporting standards are light in weight, yet sturdy and durable.

The Gelber Static Balancer shown herewith has a swing capacity of 9 inches, supporting capacity of 50 lb., and shipping weight of 2 lb. According to the manufacturer, a piece of plate glass may be supported on the balanc-



ing ways and leveled by means of the singer-tip leveling adjustments, providing a convenient and accurate surface plate for precision inspection. The balancer can also be obtained in 20 and 30-inch sizes.

#### "Super-Cut" Coolant

A coolant specially prepared and compounded for use with "Super-Cut" Zurium Bonded Diamond Wheels has been announced by Industrial Abrasives, Inc., 3724 W. 38th St., Dept. 6-S, Chicago 32. Ill. The coolant is said to cling firmly to the diamond surface and form a film which prevents hot chips from imbedding between the diamond grit, thus enabling the wheel to cut freely and coolly without loading or glazing. According to the manufacturer, "Su-

According to the manufacturer, "Super-Cut" Coolant contains no harmful ingredients, is non-toxic, and will not injure the hands or clothing of operators. It is available in concentrate form in gallon or barrel containers for mixing with 20 parts of plain water and can be applied by pump, wick, or drip feed in sufficient quantity to keep the diamond surface fully wet.

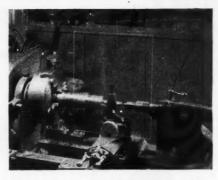


Illustration showing Dilley Magnetic Grip-Shield installed on a lathe

#### Dilley Magnetic Grip-Shield

Known as the Dilley Magnetic Grip-Shield, a safety device for use in performing machine tool operations is announced by the Dilley Manufacturing Co., 10124 Euclid Ave., Cleveland 6, Ohio. The device consists of thick transparent sheets of plastic anchored into a horseshoe permanent magnet. Made in various sizes, the device may be readily



Spoiled coolant means needless waste of precious materials, loss of vital man-hours. Dolge Steridol service can reduce your operating costs and give your operators clean, decent material to work with.

Let a Dolge service man make a competent examination of your coolant to determine whether sanitation is indicated. A sample is all he requires for laboratory analyses. Then a complete, confidential report will be submitted promptly without charge. Write for booklet S-20 on "Cutting Oil Sanitation".

THE C. B. DOLGE CO., WESTPORT, CONNECTICUT

STERIDOL Cutting oil germicides

Sturtevant

#### TORQUE WRENCH

clicks

This wrench "CLICKS" with Management because Reflex Torque Control is far faster and is uniformly accurate.

It "CLICKS" with Operators too, because it eliminates eyestrain and need for sustained close attention.

It "CLICKS" with Tool Buyers, for it is fast under all working conditions (in bad light, blind spots or deafening noise). The STURTEVANT Sensory Torque Wrench is permanently accurate.

31 Capacities—ranges from 0-8 inch ounces to 0-7200 inch pounds. with MANAGEMENT

VIII OPERATORS

with TOOL BUYERS

Records thru 3 senses simulations amously the instant the desired preset torque is reached. Makes torque control automatically fast, automatically acturate.

Write for Bulletin

PA STURTEVANT CO.

THE WORLD'S LARGEST MANUFACTURER OF TORQUE WRENCHES

positioned without tools. The magnet holds it firmly in position yet allows for moving of the shield with a slight twist to suit operating conditions.

twist to suit operating conditions.

The Dilley Magnetic Grip-Shield, according to the manufacturer, deflects flying chips, metal dust, sparks, oil, and liquids so as to protect machine operators without obstructing vision. It may be used on various types of machinery, including lathes, grinders, drill presses, milling machines, buffing and sanding machines, and so on.

The device is available in sizes from 3 x 4 to 8 x 10 inches and can also be supplied in a hood type for long-time

operations.

#### Ray Automatic Feed Control

An automatic feed control for engine lathes is now being marketed by Independent Specialties, 152 W. 75th St., Chicago 21, Ill. Available in models for Logan, Atlas and Craftsman lathes, the control is designed for attachment to the apron of the lathe for operating the half-nuts mechanically. According to the manufacturer, the attachment causes the carriage to stop instantly at

any predetermined point, with operating speeds being governed only by the capacity of the lathe or tool used.

Arranged to hold work to very close



Ray Automatic Feed Control for Logan Lathe

limits and to relieve the operator of strain from close watching and constant measuring, the Ray Automatic Feed Control is claimed to provide for the elimination of damage to work or tools. By allowing the tool to cut a relief in the work on the last turn of a thread instead of disengaging the halfnuts and simultaneously withdrawing the tool, all threads, long or short, from 4 to 224 per inch may be cut without back gearing, it is claimed.

## DERBYSHIRE Fine Precision LATHES



## CHUCKS Attachments

Illustrated
DERBYSHIRE
TWO-SLIDED
SLIDE REST
on
MAGNUS
LATHE

F. W. DERBYSHIRE, INC., WALTHAM 54, MASSACHUSETTS

# EVERY DOLLAR INVESTED IN BOICE-CRANE HELMET HEAD DRILL PRESSES DOES THE WORK TWO SPENT ON OVERSIZE MACHINES

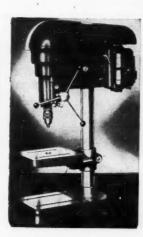
The most durable, sensitive press in its class.

One, two, three and four spindle types. High and slow speeds; bench or floor type; slotted or oil trough table. Over 75 models.

Sealed against hazards common in other presses. The only drill press under \$100.00 with an approved guard included as standard equipment: the first guard that allows easy speed changing.

Five carefully predetermined efficient speeds, one for every operation. New self-centering 30-degree pressure angle 6-tooth involute spline. Spindle, quill, and spindlepulley are held in permanent, perfect alignment.

The longer, larger diameter quill is supported in head by three long bearings, permitting more accurate deep hole drilling than by other presses in the same price range.



PRODUCTION-PROVED

SAFETY ENGINEERED

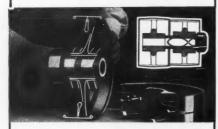
Write for free
48-page catalog.

BOICE-CRANE COMPANY
937 Central Ave.,
Toledo 6, Ohio



#### TO PREVENT WASTE OF OIL

You will effect a triple saving of Oil, Power and Labor when you equip your Loose Pulleys with BROWN RING-OIL-ING BUSHINGS. Instead of lubricating your Loose Pulleys every few days, you



will change to once in 30 to 90 days. This enables you to lubricate your Loose Pulleys, Shaft Hangers and Pillow Blocks at one time and thereby save time and labor.

#### **BROWN RING - OILING BUSHINGS**

Since the lubricant applied to the ordinary Loose Pulley must revolve, much of it thrown off by centrifugal force and wasted, this causing starved lubrication and a constant loss of power. RING-OIL-ING BUSHINGS stop this loss because every revolution of the Oil Ring in the Reservoir delivers lubricant to the Shaft, where, by means of deep, variable-pitch oil grooves, it is taken across the bearing and returned again to the Reservoir without waste. SEND FOR BULLETIN 22-M.

## BROWN ENGINEERING CO.

The control can be used in performing boring, grinding, internal threading, and other operations in which a screw and half-nuts are used for the movement of the carriage.

#### Pull-Down Attachment for Colonial Utility Broaching Press

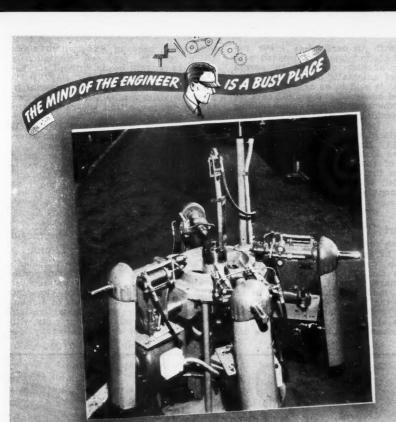
The Colonial Broach Co., Detroit 13, Mich., announces that its utility broaching press is now available with a pull-



Colonial Utility Broaching Press Equipped with Pull-Down Attachment

down attachment, making it suitable for pull-broaching as well as push-broaching. The increase in flexibility thus provided is said to be particularly useful where extreme broaching accuracy is required or where the broaches used are too small in diameter to be pushed through the work.

The attachment includes two vertical guide rods, fastened together top and



#### Atlas ADAPTATION DRILLS 4 HOLES **AUTOMATICALLY, SIMULTANEOUSLY**

Labor-saving cost-cutting tools will be more important than ever in peacetime competition. Possibly you can use this production idea developed by the engineers of the Pacific Enamel Works of the American Radiator & Standard Sanitary Corp., Richmond, Calif.

An air-operated jig fixture positions the

work, then after a timed interval air cylinders advance the drills for simultane-

ous drilling to save many production hours.

Keep in mind the fundamental machining motions of the Atlas 4 Tool Team in making your peacetime production plans. Send for latest catalog with complete tool specifications and capacities.

ATLAS PRESS CO., 946 N. PITCHER ST., KALAMAZOO 13D, MICH.

SMALL-PARTS MACHINING









bottom with tie-bars. The lower tiebar of the attachment is provided with a puller adapter designed to permit the use of automatic pullers. Accurate alignment is said to be assured through the use of hardened and ground bars for guiding the broach, the guides sliding in long bushings pressed into the platen bed.

The attachment is available on Colonial Utility Broaching Presses ranging from 4 to 10 tons rated capacity. The strokes of the presses range from 24 inches on the 4-ton to 36 inches on 10-ton model, with strokes adjustable to lesser amounts by means of stops.

be readily used in all positions, and welds can be produced continuously with overlapping beads without the necessity of removing the slag, it is claimed. According to the manufacturer, deposits can be heated and drawn to any temper within the range of the type rod used.

The Hobart Tufanhard Electrode is designed for operation on either alternating or direct current, straight polarity being recommended when using d. c. machines. The electrode is made in 14-inch lengths in ½, 5/32, 3/16, and ½-inch diameters and is packed in 5 and 25-lb. cartons.

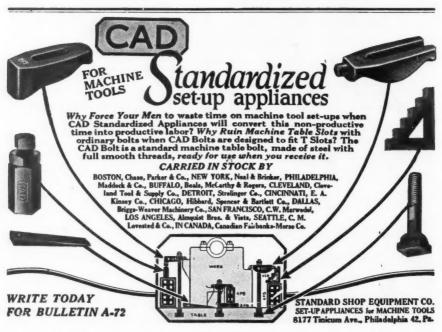
#### Hobart "Tufanhard" Electrode

A heavy coated hard-surfacing electrode to be known as the "Tufanhard" has been developed by The Hobart Brothers Co., Electrode Division, Hobart Square, Troy 1, Ohio. The electrode is made in three grades designated as the "600," "400" and "250," the numbers corresponding with the Brinnel hardness of deposited metal.

The Hobart Tufanhard Electrode can

#### Die Separator for Lyon-Raymond Hydraulic Elevating Table

The Lyon-Raymond Corp., 2305 Madison St., Greene, N. Y., announces the availability of a die separator for use with its portable hydraulic elevating table. The separator consists of a tubular superstructure which is fastened to the base of the table by four bolts with wing nuts. Dies are separated by elevating nuts.



SUPERIOR DIESELS—Dependable and economical power for every purpose, in every branch of American industry, on land, sea, or inland waterways.

MARINE AND STATIONARY ENGINES . . . . 28 TO 1325 HP GENERATOR SETS, 20 TO 930 KW



#### "Sunnen Precision Hone is the Only Equipment We Have Found That Will Give Us the Absolute Precision Required"

Says The National Supply Company, manufacturers of Superior diesel, oil, and gas engines. On needle guides for diesel engine fuel pumps, a micro No. 1 finish is required in 1045 steel, 45 Rockwell C, and no tolerance is allowed.

This is another example of the many tough jobs being licked by using Sunnen honing. While accuracy is guaranteed to be within .0001", it has often been held to .000025" in hard steel. Such accuracy plus super-smooth finish assures absolute interchangeability. It keeps costs down and saves material by reducing the number of rejects.

If you have an internal finishing problem, find out how the Sunnen Precision Honing Machine might be applied to your job. Call in a Sunnen engineer. He will be glad to give you complete information and recommendations or write for complete information.

SUNNEN PRODUCTS CO. • 7933 Manchester Ave., St. Louis 17, Mo.
Canadian Factory: Chatham, Ontario



#### Typical Jobs



Aircraft Hydraulic Brake Cylinder. Honing 3 times faster than lapping — and gave a straighter hole.



Carbureter Idler Valve Jet. Hole is honed after reaming for smooth action.



Bearing. A very small part. 2 micro-inch finish necessary.



Roller Bearing Outer Race. Finish improved from 12 micro-inches to 2 microinches.



Aircraft Carbureter Operating Valve Sleeve. Sunnen honing eliminates distortion from assembling operation.





SAVE MONEY...

SPEED PRODUCTION...

SAFEGUARD PRECISIONI



Improved ... Balanced

## GRINDER DOG

"The dog without a bite"

If you are seeking increased production, this dog can be an important factor. It is easy to adjust, with instant positive holding action...yet may be used safely on precision finished work without danger of marring, because the cam face is ground smooth both as to surface and contour, thus reducing spoilage and rejects.

An excellent dog for all types of grinders and especially for semi-automatic machines, because once adjusted for size, all that is necessary in setting up work is to simply release the cam. The harder the drive, the tighter it grips.

Available in four sizes to take work from ¼" to 2" diameter. Made entirely of steel with ground finish. Send for Grinder Dog Bulletin S-45.

THE READY TOOL COMPANY
IRANISTAN & R. R. AVENUES
BRIDGEPORT, CONNECTICUT

BRIDGEPORT, CONNECTICUT

OTHER RED-E PRODUCTS YOU SHOULD KNOW...
CEMENTED CARRIEST TIPEED
LATHE & CRIMBER CENTERS
WIS the RED-E STATE THE NEW
with the Teel State The Later

HIGH SPEED STEEL CENTERS
RED E HEN DEPARTURE
BALL BEARING CENTERS

MILLING MACHINE

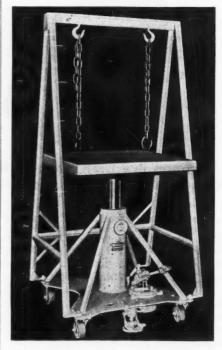
A FACE PLATE DOGS

GRINDER DOGS

Bulletins on any or all of these Products on request.

vating the table top, fastening the top section of the die to the superstructure by means of chains, and then lowering the table top with the bottom section of the die.

Being readily demountable, the die separator does not limit the use of the table which may quickly be made avail-



Lyon-Raymond Hydraulic Elevating Table Equipped with Die Separator

able for such work as the transferring of dies in and out of presses, the supporting of overhanging materials, and so on.

#### Detroit Standard Thread Milling Cutters

A more than 60 per cent increase in the number of sizes of standard thread milling cutters carried in stock ready for thread grinding to user specifications has been announced by the Detroit Tap & Tool Co., 8432 Butler Ave., Detroit





A New Screw Machine Tool of outstanding design and construction making it possible to perform many of the knurling jobs formerly considered impossible with tools of other types.

Built on a new principle, operated from the turret, with feed and pressure equally applied simultaneously to both sides of work. Speedy in operation, giving clean, accurate knurling in a minimum of time.

Sturdily built with the usual Boyar-Schultz quality of precision manufacture.

Be Sure to Write for New Detailed Circular



FRONT VIEW

#### BOYAR-SCHULTZ CORPORATION

2120 Walnut Street

Chicago 12, Illinois

11, Mich. The standard cutters now available include 12 new shell type cutters, making a total of 52 shell type standards; and 20 new shank type cutters, making a total of 32 shank type standards. All of the new shank type cutters are available in either Jarno, Morse, or Brown & Sharpe tapers, as are the original standards.

Detroit Standard Thread Milling Cutters, moreover, are available with virtually any thread form, including Acme, Buttress, National, Modified Whitworth, and so on, and for both internal and

external thread milling.

#### New Books

"Checklist on Reconversion Personnel Practices." Since reconversion involves realigning people and policies, as well as equipment and products, the Labor Relations Institute, 1776 Broadway, New York 19, N. Y., has compiled a "Checklist on Reconversion Personnel Practices," containing 152 questions which confront management during change-over period.

The 28-page list is divided into three

sections, devoted respectively to wage and salary stabilization, manpower utilization and collective bargaining. Topics covered in the first-named-which was adjudged the most urgent reconversion problem in a recent poll of 1,000 war plants conducted by the Institute—include bonus plans and commissions, fringe raises, incentive plans, sick leave, transfers, upgrading, vacations, the Wage-Hour and Walsh-Healey Acts, and so on.

Eighty-five questions, properly checked off in the convenient "yes-no-continuerevise-install-drop" boxes provided in the pamphlet, help the user tell his own story about manpower utilization in his plant. Typical questions deal with such sub-topics as absenteeism, apprentices, child labor, discipline, awards, employee counseling, layoffs, exit interviews, supervisory practices, inplant feeding, training, re-employment of veterans. women workers, white collar workers,

and the like.

Part three of the checklist calls the roll of collective bargaining clauses, so that the employer can tell at a glance whether his wage agreement with the union contains provisions covering such matters as arbitration of disputes, bulle-



#### **VERSATILITY**



#### = ACCEPTABILITY!



SINGLE UNIT MODEL



DOUBLE UNIT MODEL

One of the reasons for Gerotor's steady acceptance by manufacturers of machinery is the unusual <u>versatility</u> of Gerotor Hydraulic pumps. Such a reputation must be earned—and Gerotor has demonstrated its versatility by its adoption as standard equipment on a wide variety of nationally known machinery for both war and post-war uses.

If you have a tough pump problem, why not let the Gerotor Engineering Staff help you solve it.





GEROTOR MAY CORPORATION . BALTIMORE, MD. - LOGANSPORT, IND.

tin boards, hiring procedure, leaves of absence, safety and health, time study.

and so on.

In a brief foreword, the editors point out the relationship between successful business operations and effective employer-employee relations. Copies of the checklist are available at \$1.00 each.

"Spur and Helical Gear Problems" is the title of a handbook especially adapted for machine designers and product engineers which is now being published by W. E. Dalby, 15295 Seymour, Dept. M. Detroit 5, Mich. Written by Walter E. Dalby, the book contains simplified charts for calculating pin measurements for spur gears and ball measurements for helical gears. In addition, the book includes charts for calculating the pitch diameter of the external or internal gear which will mesh with three gears of any diameter in multiple drill heads or gear trains in special machines.

Comprising a total of four chapters, "Spur and Helical Gear Problems" is available at a price of \$1.59 per copy

postpaid.

Time Study and Motion Economy for Supervisors. By James D. Shevlin. Published by National Foremen's Institute, Inc., Deep River, Conn. 76 pages, 5½x8 inches. Cloth bound, four-color printing. Price, \$2.00.

By means of this book, the author

By means of this book, the author presents in a convenient manner the exact data required by supervisors to streamline the job operations of the crews for which they are responsible. For quick reference and ready use, the book is divided into three parts, namely: (1) Motion Study; (2) Time Study, and (3) Charts and Diagrams.

Under part I are the following sections: Make a Breakdown; Question the Breakdown; Pre-Position Tools and Material; Proper Work Areas; Gravity Feed Hoppers; Drop Delivery Chutes; Balance Both Hands; Holding Devices; Foot Pedals and Chair; Sell the Pro-

posed Method.

Under Part II the following divisions are included: How a Time Study Is Made; The Foreman and Time Study: The Foreman—Before, During and After Time Study; Time Study and Cost Reduction; The Worker's Pay Check; Ten Commandments of Better



MARQUETTE MFG. CO., INC. Minneapolis 14, Minn.



#### **Penciltex Pencil Cloth Assures Better Reproductions**

Penciltex is more durable than tracing cloth. The velvety smooth surface is moisture resistant and extremely sensitive to your favorite hard drawing pencil. Any drawing on permanent Penciltex produces superior prints because of the ultra transparency It is sound economy and good insurance to invest a little extra today for better records tomorrow.

#### The Frederick Post Company

3650 AVONDALE AVE . CHICAGO 18, ILLINOIS
DETROIT . HOUSTON . CHICAGO . LOS ANGELES . MILWAUKEE



INSTRUMENTS - EQUIPMENT - BLUE PRINT PAPERS - KINDRED SENSITIZED PRODUCTS

NATION WIDE NETWORK OF POST DEALERS



Inside and outside the design is new. In it are utilized fewer parts, and they are made of magnesium and aluminum for extreme featherweight lightness. The alloy steel shaft diameter is unusually large for sustained smooth and true operation. The speed, as before, is governed at 50,000 R.P.M. and there are selected ball bearings, front and rear. The same low price, \$29.75 in U.S.A. remains.

Weight 12 ounces; length 6% inches; chuck size 1/8 inch. Wheel guard removed for better illus-

MADISON-KIPP CORPORATION 208 WAUBESA ST., MADISON 4, WIS., U. S. A.

Methods (simplified version).

An unusual and helpful feature of the book is its large group of charts for illustrating the text. These graphic pictures of time and motion studies before and after completion are all printed in four colors to enable the reader to quickly and accurately grasp the principles dealt with in the text. Other features include a conference guide and supplementary line drawings.

#### Shop Literature

Lepel Induction Heating Equipment. A catalog illustrating and describing and providing tabular data on a complete line of high frequency heating equipment for hardening, annealing, brazing, soldering, and melting operations has been published by Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y. Copy free to executives upon request.

"Straight to the Point" is the title of a 9x12-inch three-color booklet published by the Douglas Machinery Co., Inc., 142 Broadway, New York 7, N. Y., describing the features and applications of the Rotorex Precision Tapping Attachment for equipping the regular model drill press for controlled-lead precision tapping. Copy free.

"Bearing Application," another booklet in its series of treatises for designers on the fundamentals of ball bearings, is announced by New Departure. With 78 drawings and charts and a clear and orderly description, the booklet covers among other subjects the most important fundamentals of bearing mounting applicable to all types of bearings; preloading methods and their effect on housing fits: the effect of preloading on bearing life; bearing creep; the use of duplex, shielded and sealed surfaces, and so on.

Copy of Booklet BA is available free from the Advertising Department of New Departure, Division of General Motors Corp., Bristol, Conn. A com-panion booklet entitled "Details of Design," issued last year and covering the details of shaft and housing design for ball bearings, will also be supplied to those who do not have a copy.

Style B"

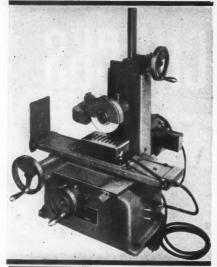
DRILL CHUCKS

FOR A POSITIVE DRIVE in any machine having a Morse Taper hale in the spindle . . . Collet action, hardened and ground, concentric within .002" and designed to allow close-center multiple drilling. Furnished in Morse Tapers 0 to 5, accommodating drills from #60 to 1%" diameter.

Style "B" Drill Chucks are now standard, equipment in plants of many leading automobile and airplane manufacturers. Economize by including them in your production tealing setups—for jobs of tomorrow.

SCULLY - JONES

# SANFORD



HIGH SPEED BENCH SURFACE GRINDER

ACCURACY WITHIN .0001

A sensitive, highly accurate, machine specially designed "For The Job That Fits in Your Palm"

Write for Bulletin

SANFORD MFG. CO. 1279-81 SPRINGFIELD AVE. IRVINGTON 11, NEW JERSEY "Aero-Thread" Screw Thread System for use in highly-stressed threaded assemblies of light metal and steel is the subject of a four-page bulletin published by the Aircraft Screw Products Co., Inc., 47-23 35th St., Long Island City 1, N. Y. Copy of Bulletin No. 242 free upon request.

Reynolds Aluminum Forging Stock is described as to classes, alloys, sections and sizes, identification, length designations, and so on, in an eight-page bulletin released by the Reynolds Metals Co., Inc., Aluminum Division, Dept. MMS, Louisville 1, Ky. Also included are complete tables of equivalents, weights, tolerances, and chemical compositions. Copy of bulletin No. 23-A free upon request.

South Bend 9-Inch Lathe Catalog 9-G, issued by the South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind., illustrates in full color and completely describes a line of 9-inch engine and toolroom lathes. Also shown are 9-inch precision turret lathes with ½-inch collet capacities. In addition, lathe tools, accessories, motors and controls, and attachments for special classes of work are illustrated and described in detail.

Copy of this 36-page 11 x 8½-inch catalog is available free to mechanical executives addressing requests on their company letterheads.

Directory of Products and Engineering Literature. The Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis., has issued a comprehensive directory of products and engineering literature describing the lines of equipment furnished by this company to a wide variety of industries. The major portion of the directory is devoted to a listing of more than 1,600 product types. New products added since the previous directory are indicated by a star for easy identification.

Engineering literature is arranged according to the product discussed, with new bulletins also starred. In most cases, the literature contains operating data, charts, formulas, and technical information of value to the man specifying and buying equipment. Copy

of directory free upon request.

# Adjustable Limit Snap Gages



In Stock -- Immediate Delivery

Send for Our Catalog and Price List

MAIL ORDERS PROMPTLY FILLED

We carry a complete line of H.S. Drills, Milling Cutters, Lathe Tools, H.S. & C.S. Taps & Dies. Drill Chucks, Lathe Chucks, Files, Special Taps, Dies

RANGE	LIST PRICE				
0 to 1/4	\$10.80				
1/4 to 1/2	11.50				
1/2 to 3/4	11.50				
3/4 to 1	12.00				
	12.00				
11/4 to 11/2	12.50				
11/2 to 13/4					
13/4 to 2					
2 to 21/4					
21/4 to 21/2					
21/2 to 23/4					
23/4 to 318					
318 to 378					
	16.00				
	16.00				
	17.00				
	17.00				
	19.00				
	19.00				
518 to 61/8					
6½ to 6½					
178 10 0/8	21.00				

LIST PRICE LESS 40%

CENTER TOOL CO. Machine Shop Equipment 151 CENTRE ST., N.Y. 13

# "WHEELS LAST LONGER WHEN I DRESS THEM!"

Says The Metcalf Minute Man

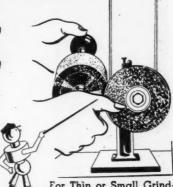
What The Metcalf Wheel Dresser Does:

- \* Brings up sharp corners on thin wheels.
- \* Trues up a square edge.
- \* Turns a bevel rapidly and accurately.

Famous three-fold Metcalf principle:

- ★ Cutting effect of one abrasive wheel on another.
- \* Hi-speed, gyroscopic action.
- \* Steadying effect of heavy ball-handles.

Dresser-Wheel replacement costs little—means added savings and greater profits for you. Write today for full details in Bulletin 69-18.



For Thin or Small Grinding Wheels

Complete .....\$5.00 Extra Wheels only. .75

COVEL-HANCHETT CO.
BIG RAPIDS MICHIGAN

Kett Portable Tool Attachments. The Kett Tool Co., Union Central Bldg., Cincinnati 2, Ohio, now has available a file type catalog containing complete illustrated, descriptive, and tabular information on a line of portable tool attachments which can be used with any ¼-inch electric or pneumatic portable drill for performing drilling, cutting, grinding, nut setting, and screw driving operations. Copy free upon request.

Precision Ground Taper Pin Specifications. A compilation of standards for precision ground taper pins based on the manufacture of millions of such pins is now being made available by The Centerless Grinding Co., 19 Staples St., Bridgeport 1, Conn. This data book includes such specific information as tolerances on degree of taper, roundness, overall length and size and provides users of taper pins with a definite set of standards necessary in the production of closer tolerances.

Copy is available free to engineering, processing, or purchasing departments, as well as others having the job of

specifying taper pins.

Abrasive Chuck Segnments. A 24-page booklet listing prices for abrasive segments used in chucks has been published by Norton Co., Worcester 6, Mass. Copy free upon request.

"The Cold Sawing of Metals." The Motch & Merryweather Machinery Co.. Penton Bldg., Cleveland 13, 'Ohio, has prepared a plastic-bound manual on the cold sawing of metals by the triple-chip method. Advantages of this method of sawing metals using the Motch and Merryweather Cold Sawing Machine are discussed in the manual, copy of which is available free. Ask for Manual "B-6."

"Facts About Contour Form Grinding Precision Contours" is the title of a 16-page pictorial booklet issued by The Thompson Grinder Co., Dept. 13, Springfield, Ohio. The booklet contains authoritative information on the crush form grinding of precision contours on surface grinders using a completely engineered machine. Copy is available free to mechanical executives addressing requests on company letterheads.



# Rely on R & N Taps

For your new or old Peace Time or present War Time requirements, rely on R & N, the modern, ground from the solid, Taps for better work.

Put your problems up to our service engineers. If you use Standard Taps or Intricate Specials, they will recommend the best for the job.

Taps and Tapping has been our specialty for more than thirty years. We offer useful assistance to you.



Send for Reiff & Nestor Catalogue and Tapping Guide. A request on your Letter Hend brings it.

### REIFF & NESTOR COMPANY

...Manufacturers...

LYKENS

PENNSYLVANIA

358

# PRECISION GROUND SEELE BENCH PLATES



Here's the Bench Plate to consider

where inspection and assembly of small parts is required.

Precision Ground of special semi-steel these wear resistant Bench Plates are designed to provide rigidity and will retain accuracy under constant use.

On the assembly line their smooth, solid working surface helps materially to maintain set production speeds.

Made in 2, 4 and 6-inch thickness. Sizes up to 36x96-inches are available either precision ground or planer finished. Larger sizes planer finish only.

### CHALLENGE MACHINERY COMPANY



# THE HEINRICH HEAVY-DUTY HANDNIB

A Hand Operated Combination Nibbling, Shearing, Punching and Rod Cutting Machine. (With swivel base)

Capacity: Nibbling and Shearing 3/15" flat stock . . . Punching Holes up to ½" in ½" sheets . . . Rod Cutting 3/16", ¼", 5/16" and ¾" round bars. Ask for Descriptive Folder.



NATIONAL MACHINE TOOL 1536 CLARK STREET RACINE, WISCONSIN Natco Holeway Machines are the subject of a 28-page circular published by the National Automatic Tool Co., Inc., 714 S. N St., Richmond, Ind. Operations performed by these machines are illustrated diagrammatically and pictorally so as to make the data presented clear both to engineers and to men who are not technically inclined. Copy of Circular No. 145 free to mechanical executives upon request.

Reynolds Aluminum. To assist the designer and industrial engineer in the building of new products or refashioning present ones, the Reynolds Metals Co., Inc., Aluminum Division, Dept. MMS, Louisville 1, Ky., has prepared an attractive catalog on Reynolds Aluminum and its important role in tomorrow's products. Printed in three colors, including aluminum, the catalog discusses the advantages of Reynolds aluminum alloys and their properties, applications, principal forms, special forms, fabrication, and finishing. In addition, Reynolds fabricating service is treated. Copy of Catalog No. 100A free upon request.

Armco Magnetic Ingot Iron for d. c. applications is the subject of a 24-page booklet published by the American Rolling Mill Co., Middletown, Ohio. Contained in the booklet is a section on the fabrication of magnetic ingot iron, including data on the effect of strains on the magnetic properties, hot and cold working, machining operations with the aid of standard tools, and accepted methods of welding. Copy free upon request.

Firthite Field Service Posters. In order to assist industrial plants in reminding machine operators of the importance of the proper handling and correct usage of carbide tools, the Firth-Sterling Steel Co., Dept. MMS, McKeesport, Pa., is now offering a series of shop posters which deal with the subject in a humorous yet forceful style. Measuring 17 x 22 inches in size and printed in four colors, the posters include cartoon drawings by Cy Hungerford, internationally famous Pittsburgh cartoonist, and are available free to plant executives addressing their requests on their company letterheads.

Coltioners Positioners

Modern Production Welding is done on C-F Positioners—without crane assistance, without sling crews, without extra floor space for "flopping" the weldment around so that all sides can be welded "down hand." On a C-F Positioner, the welder himself tilts and turns the weldment to position with a push button control—can tilt it up to 135° beyond horizontal, turn it to any angle or rotate it at any speed from 0 r.p.m. up. C-F Positioners come in capacities for all weldments—from small hand operated positioners to giant units that easily handle great weldments weighing up to 30,000 lbs. (1 No. 140, C-F Positioner, capacity 14,000 lbs. and 2 No. 60, 6,000 lb. capacity illustrated.)

CULLEN-FRIESTEDT CO.
1311 S. KILBOURN AVENUE CHICAGO 23, ILL.

WRITE FOR CATALOG



# CHICAGO STEEL PRESS

No. 253



# SPEED WAR PRODUCTION OF SHEET METAL WORK

USE FOR ...

- 1. FORMING
- 2. EMBOSSING
- 3. MULTIPLE PIERCING
  - 4. NOTCHING
  - 5. BLANKING

of Ammunition Cases, Bomb Box Liners, Bomb Fins, Aircraft Parts and Many Other Offense Products.

The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

Write for Circular No. 255

# DREIS & KRUMP MFG. Company

7418 LOOMIS BLVD.

CHICAGO 36

ILLINOIS



# NO WASTED TIME with this speedy No. 130A FURNACE



FIREBOX
7 ½ % high
13" wide
16½" long

Write for
complete
specifications

rreating high-speed steels, dies and tools. Reaches operating temperatures FAST to save time and gas. Gets the job done before conventional furnace warms up. Lined with high temperature refractory. Counterbalanced door opens upwards. 4 - Burner Unit shown for temperatures 1400-2000° F. 6-Burner Unit for 1800-2400° F. Complete with Carbofrax hearth, G.E. Motor and Johnson Blower.

4-Burner . . . \$29

6-Burner, \$325 F.O.B. Factory

FREE Complete Johnson Catalog describes furnaces for melting, pot-hardening, annealing and heat-treating. Write for your Free copy.

JOHNSON GAS APPLIANCE CO., 571 E. Ave. N. W., Cedar Rapids, Iowa Please send me information on Johnson No. 130A. Complete Furnace Catalog.

Name . . . . . .

Address

City..... State....



# DE-STA-Co ARBOR SPACERS

Save time in setting up milling machine cutters, and wherever accurate spacing must be obtained and maintained.

Made of metal. Not only for greater accuracy, but also because they will not be affected by heat or oil. And can be used over and over. Standard sizes from .001" to .0125". Specials, cut from bar stock, in any length and ground to decimal.

Order a set of De-Sta-Co Spacers from your Mill Supply Distributor today.

DETROIT STAMPING CO.

349 Midland Ave. Detroit 3. Mich.

Knock-Out Drill Chucks are the subject of an eight-page bulletin prepared by the K. O. Lee Co., Aberdeen, S. Dak., containing complete descriptive illustrative, and tabular information, including prices. Copy free upon request.

Oilgear Horizontal Broaching Machines. A 16-page revised bulletin on its fluid power variable speed horizontal broaching machines for high speed, pull type, all purpose internal and external broaching operations is announced by The Oilgear Co., 1301 W. Bruce St., Milwaukee 4, Wis. Copy of Bulletin 20000B free upon request.

"Sanding and Finishing" is the title of a booklet prepared by The Carborundum Co., Niagara Falls, N. Y., containing important information concerning coated abrasive products and their uses. The booklet features data on sanding and finishing processes, abrasive grains, classification of grain sizes. bonding materials, coatings, backing materials, flexing, stocking, identifying and specifying coated abrasive products, as well as recommendations for belt splices, machine specifications for belt sanding, and specifications for standard coated abrasive products. Copy free upon request.

Ingersoll-Rand Catalog No. 100. The Ingersoll-Rand Co., Publication Division, Phillipsburg, N. J., now has available an unusually comprehensive leatherette covered and gold embossed catalog covering the complete line of equipment offered by Ingersoll-Rand. catalog is divided into 12 major sections as follows: Reciprocating Compressors and Vacuum Pumps; Turbo-Blowers and Compressors; Rock Drilling Equipment; Pneumatic Tools; Hoists; Railway Maintenance of Way Equipment; Pumps; Steam-Jet Ejectors; Refrigerating Units; Diesel and Gas Engines, and Miscellaneous. In addition, the catalog includes a section containing engineering data on the various equip-ment described throughout the sections above. Copy of Catalog No. 100 can be obtained by plant engineers, production supervisors, and other mechanical executives addressing requests on their company letterheads.

# USE

# Fluid-Motion for Modern form-dressing

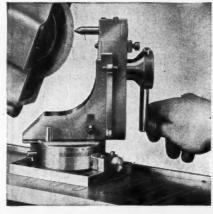
# ONE SETTING HANDLE CONTINUOUS MOTION

The J & S Model "E" Radii and Angle Dresser in the new "Fluid-motion" series is one of the finest precision dressing instruments procurable — regardless of cost.

### FEATURES

Fluid-motion dressing .0001" accuracy Automatic centering 14" wheel capacity Large range yet compact Chatterless and dustproof

J. & S. TOOL CO.
477 MAIN ST. E. ORANGE 5, N. J.





# Consulting Engineering Service Available

Can supply complete working drawing of engines or special tools or machinery. Has designed 132 gasoline and oil engines complete in every detail.

E. W. ROBERTS, M.E. 415 Main St., Cincinnati. Ohio "Fifty Facts" is the title of an interesting booklet issued by Perfection Tool & Metal Heat Treating Co., 1740 W. Hubbard St., Chicago 22, Ill. The booklet cites actual cases in 50 manufacturing plants of how more than half of the tools in common use were made to work longer and better through the employment of improved ways of hardening soft steels and a supplementary treatment known as "Ad-Life" for previously hardened, finished tools. Copy free upon request.

"The Milling Machine and Its Attachments" is the title of an 83-page booklet published by the Kearney & Trecker
Corp., Milwaukee, Wis. The second in
the Milling Practice Series being published by this firm, the booklet, which
is divided into nine chapters, covers
knee and bed type milling machines,
their attachments and their operation.
Complete explanations and numerous
illustrations are said to make the
booklet a valuable aid in the education
and training of shop personnel. Copy
free to mechanical executives.

# MECHANICAL ENGINEERS ELECTRICAL ENGINEERS

Engineers experienced in Machine Design and Sheet Metal Products or Household Appliances.

Must have successful pre-war background. Permanent position with large, progressive organization. In replying give full particulars, places worked, projects, etc.

### INSTITUTE OF PRODUCT RESEARCH

Dept. LAH

448 S. Hill Street

Los Angeles 13, California

Handbook of Metal Sawing. In this convenient handbook, the W. O. Barnes Co., Inc., Detroit 14, Mich., has assembled important metal sawing information gained through over a quarter century of experience in the manufacture of hack saw blades and metal-cutting band saws. The book offers suggestions and recommendations for increasing metal saw efficiency and covers newest developments in band saws for light metals, plastics, laminates, and so on. Copy free to plant executives upon request.

"Speed Surface Grinding Setups" is the title of an eight-page folder published by the George Scherr Co., 198-A Lafayette St., New York 12, N. Y. The folder is profusely illustrated with actual applications of Magne-Blox products employed to hold various types of work for surface grinding operations. Also featured is a new service offered by Scherr, namely: the production of special sizes of Magne-Blox parallels, V-blocks, and angle irons, as well as other shapes and forms to fit any type of magnetic chuck. Copy free.

# BUTTERFIELD THRED-RITE DIES

r-

ol b-

et ng ne to ne

ly

h

The modern adjustable collet die at its best.

Engineered to meet the demand for screw thread parts production on high speed equipment.



These dies can be used not only in our own Floating and Releasing Type Holders but also in any Holder designed for dies of this type.

For accuracy, speed and long life specify Thred-Rite.

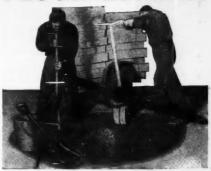
# UNION TWIST DRILL CO. BUTTERFIELD DIVISION

Factories: Derby Line, Vermont, U. S. A. Athol, Mass.; Mansfield, Mass.; Rock Island, Quebec, Can.

### STORES:

Cleveland.						 	 2	1	PC	2	E	Euclid Ave.
Chicago			. 9					1	1	5		Clinton St.
												iward Ave.
New York				٠						. 6	1	Reade St.

# NO NEED TO TIE UP TRAFFIC While Making FLOOR REPAIRS



# PLASTIC PATCH

# Sets Instantly!

Unlike old-fashioned resurfacers, INSTANT-USE is ready for service almost the moment it's put down. There is no waiting. To fix holes and ruts, you simply roll a drum of INSTANT-USE over to the hole in the floor, shovel out enough to fill the hole, tamp smooth and then pass traffic over the spot immediately. You'll have a tough, solid, permanent patch that fermerly took 24 hours to get. Bonds tight to old concrete. Withstands extreme loads. Immediate shipment.



Request Descriptive Folder . . . and Details of

FREE TRIAL OFFER



# INSTANT-USE

### FLEXROCK Co.

3615 Filbert St., Philadelphia 4, Pa.

Please send me complete INSTANT-USE information... details of FREE TRIAL OFFER—no obligation.

# GRAVITY FEED OILING.

. . with

# NEEDLE VALVE ADJUSTMENT and SHUT-OFF

Available in several models, and with either glass or unbreakable reservoir, the Gits sight Gravity Feed Oiler permits flow of oil to bearing to be varied as desired by the simple turning of a knurled screw—or completely shut off during idle machine periods. These oilers are particularly adapted to applications of excessive vibration. The styles equipped with unbreakable reservoirs are widely used in the food processing and similar industries. Range of sizes, models and prices furnished on request.

Do you have a copy of the Gits Catalog No. 60?-write for it.

# GITS BROS. MFG. Co.

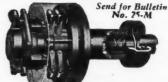
1845 South Kilbourn Avenue • Chicago 23, Illinois

Exclusive for over 35 years



# SAVE TIME and LABOR

Drive your productive machinery by the powerful, persistent torque developed by MULE-PULL Clutches...it saves time and boosts production by the smooth and instant acceleration it gives. The Loose Sleeves of these Clutches have RING-OILING lubrication which prevents ground-out bearings and avoids costly repairs. The single-arm, anti-friction ROLLER TOGGLES which actuate these Clutches give high horse power capacity; require no lubrication and are free from repairs even under constant in-and-out engagement.



# BROWN ENGINEERING CO.

# ROD GRINDING

Straight Rods 1/32" to 1/2" Diameter Diam. Tol. .0005 on Rods Up to 6' Long Diam. Tol. .001 on Rods Up to 12' Long

CENTERLESS GRINDING SERVICE

SMALL
PRECISION PINS
MADE TO
CUSTOMER'S
BLUE PRINTS
... STRAIGHT ...

. . . DOWEL . .

... TAPER.

QUICK DELIVERY

HIGH QUALITY

# COMMERCIAL CENTERLESS GRINDING CO.

6605 CEDAR AVE. Phone: ENdicott 3412 CLEVELAND 3, OHIO



For Heaviest
Production
or
Finest
Precision
Work

# GEARED-HEAD ENGINE LATHES

ACCURACY and long life . . . simplicity and ease of operation . . . operating economy and low production costs . . . all these are embodied in these precision built lathes.

Used in leading industrial plants and railroad shops . . . why not let us show how it can cut costs and increase production for you, too?

Representatives from coast to coast.

# THE BOYÉ & EMMES MACHINE TOOL CO.

CINCINNATI 15

OHIO

# SAVAGE NIBBLING MACHINE

Designed for speed and safety of all types of metal cutting.

Relieves other machine tools.

### **Cutting Capacities:**

Flat mild sheets %"
Tough alloys %"

### Tubing:

Wall thickness to 為" 1" I.D. to 36" O.D. ASK FOR BULLETIN "H"

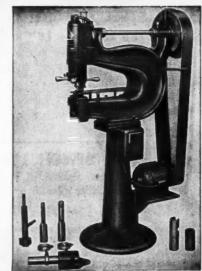
Manufactured By

### W. J. SAVAGE COMPANY

Since 1885

TENNESSEE

Ploneer Manufacturers of Nibbling Machines





ecomet diamond wheels put a smooth, keen, lasting edge on carbide tipped tools, because only critically uniform grades of diamond powder are used. Reduced from whole bortz diamonds by an intricate scientific JKS process, sizes range from standard grit of 60 to 400 while 500 to 5000 grit is available to provide the proper surface for all types of tools.

Straight cup, flaring cup, dish and other wheel types as well as hones are available in metal and resinoid bonds.

Send for the new Secomet Diamond Wheel Price List-Bulletin No. 49





Compare this to \$2000 a year

for a worker's wage whose production is limited to the extent of efficiency in needed sight control.

Write for information.

SAMPSON AXCESS SYSTEM, INC. 7-9 Liberty Square Lynn, Mass

# We can ship immediately STEEL STACKING BOXES

Top Rim Type 18" x 12" x 6". 16 Ga. with Drop Handles at \$1.27 each



### STANDARD SIZES

18 x 12 x 6..... 16 Ga. 16 x 10 x 6..... 18 Ga. 18 x 12 x 8..... 16 Ga. 16 x 10 x 6..... 16 Gg.

MADE IN OTHER SIZES



Four sizes. All Welded. Olive Green enamel.

### **BENCH TOPS**

Steel and wood with or without drawers.

Literature on request.

FACTORY EQUIPMENT CO

183 CHARLES ST. PROVIDENCE, R. I.



# Cuts Any Size Hole In METAL • WOOD PLASTICS

In the shop or on the job, replace many fixed-radius cutters with Bruno. Makes clean, fast holes in sheet metal, boiler plate, light metal alloys, plywood, plastics, masonite, rubber, fibre and other materials. Easily and accurately set for any diameter in range of cutter.

### Works well in Portable Drill, Hand Brace or Drill Press

New uses every day for Bruno Cutters. High speed steel blade easily resharpened. Designed by tool engineers.

Ask your jobber, or write Bruno Tools, Beverly Hills, Calif., Dept. MMS-9

MIN.	Model No.	Shank Size	Expansion Capacity	User's Price
100.1	100	14" straight shank	\$6"-135"	\$3.00
Mary .	100-B	Square Bit Stock	36"-135"	\$3.00
100	101	%" straight shanh	1"-21/2"	\$5.00
	101-B	Square Bit Stock	1"-216"	\$5.00
A			TOO	) LS
No. 101		Beverly	TOO	LS

# ROGERS PATENT ADJUSTABLE HOLLOW MILLING TOOL

now helping win its third war and still going strong.



Carbide Tips Optional.

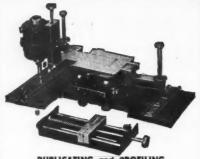


Easily Adjusted. Rigidly Locked. Rogers Built Since 1890.

THE JOHN M. ROGERS TOOL CORP.

Gloucester City New Jersey

No. 100 · B 5/8" to 1 1/2"



AUTO - ENGRAVER

Accurate Engraving with Unskilled Operators
Unskilled operators will profile or accurately reproduce in smooth lines any design, number, letter, emblem; on iron, brass, copper, aluminum, soft steels and all plastics. Here are some of its other uses . . Drills a series of holes, or profiles small parts. • Cuts an even channel for wiring on panels. • Increases accuracy and production. • Works from original drawing or templates. • Etches glass and similar items. • Will not cause distortion. For information and prices write Dept. M.

AUTO-ENGRAVER COMPANY 1776 Broadway, New York, N. Y.

# DERBYSHIRE Fine Precision WIRE CHUCKS







	Ca	pa	city
MAGNUS-ELECT	.004"	to	.315"
• D. LARGE	.004"	to	.250"
• D. W. W	.004"	to	.196"
STANDARD ACCU			

F. W. DERBYSHIRE, INC.

# KAR Permanent CHUCKS



Cannot Fail

Hold Work Tight

Generate No Heat

An outstanding and exclusive advantage of the KAR Permanent Magnet Chuck is its ability to hold smaller pieces securely due to the close spacing of the pole pieces.

Release Easily Used Wet or Dry Use No Power



THE KAR ENGINEERING CO., Inc.

GREAT BARRINGTON

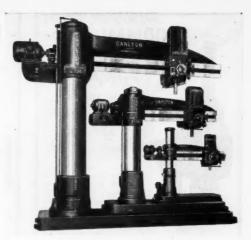
MASSACHUSETTS

# Features:

- 1. All ball-bearing throughout
- 2. Low-Hung Drive to Spindle
- 3. Quiet running at all speeds
- 4. Requires oiling only every six months
- 5. Concentrated and convenient control
- 6. Constructed on unit principle

### MADE IN SIZES OF

- 7. 3 feet to 12 feet inclusive arm lengths
- 8. 9 inch to 26 inch column diameters.



THE CARLTON MACHINE TOOL CO. CINCINNATI 25, OHIO, U. S. A.

# "DUPLEX" Nut Slotter!

Adaptable to Milling of parts of various shapes and sizes . . .

SLOTS 2 SIZES AT ONCE, TWO CONTINUOUSLY OPERATING CONVEYORS. AUTOMATIC BURR REMOVAL...AS HIGH AS 3000 SLOTTED PARTS PER HOUR.



# PELLOW MACHINE Co.

13510 FOLEY AVE., DETROIT 27, MICH.



mediate stage.

No. 2 Positive Tapper drives from 3/8" to 3/4".

No. 3-A Positive Tapper drives from ½" to 11/4" in steel or other material. Floating Chuck Jaw automatically centers tap. Write for details.

# DORMAN MACHINE TOOL WORKS



Combination Demagnetizer and Electric Etching Pencil. Marks symbols in hardest steel. Demagnetizes instantly. One of our models popular in tool rooms for 15 years.

Luma Electric Equipment Co.
DEPT. MS TOLEDO 1, OHIO



● The Almond Three Jaw Drill Chucks were the first to be placed on the market. They were Pioneers in the field of Drill Chucks!

ALMOND THREE JAW DRILL CHUCKS are furnished in 9 sizes with capacities from 3/16" to 1". These are made in heavy and light duty types with a taper arbor hole or with a threaded arbor hole. For Portable Drills.

Write for Complete Details





### Study the construction of this vise



It is made flush, parallel and square. Stand on side or end, or fastened against angle plate, it gives accurate basic positioning. Numerous fixtures make it a many-purpose jig or fixture for repeat-operation work.

# GRAHAM MULTI-PURPOSE VISE KNURL HOLDER FITTING LATHE TURRET



The "adjust angle" feature permits cutting straight, spiral or checkered patterns using only straight knurls. Handles work up to 2½" dia. Shank to fit your turnet.

Request Illustrated Price Circulars

GRAHAM MFG. CO.

31 BRIDGE ST.

EAST GREENWICH, R. I.



Featuring RIGID Construction — SIM-PLICITY of design — MAXIMUM tool RIGIDITY — FULL OFFSET in EITHER DIRECTION — Inter-changeable FRIC-TION-LOCK ADAPTERS, THREE positions for tool or boring bar.

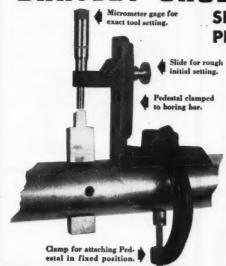
For complete and detailed information write for Folio No. 10.

MEYER TOOL & ENGINEERING CO.

1821 Marquette

Saginaw, Michigan

# BARTELT GAGES SAVE TIME



# SHORTEN SET-UPS WITH PEDESTAL MICROMETER

Slide for rough Model "AM" Bartelt Pedestal Micrometer (shown) is designed for setting tools in boring bars. Conventional cutand-try method is unnecessary as tool can be brought to exact position in only one setting. Speed and accuracy of adjustment reduces set-up time and helps importantly to increase production. Bartelt gages, available in six models, are valuable and practical shop equipment for tool adjusting, work positioning, inspection, checking, and many other gaging operations. Write for descriptive circulars today, showing six models now available for various kinds of work.

### BARTELT ENGINEERING CO.

1216 Partridge Ave.

BELOIT

WISCONSIN



# of ALL TYPES...

Quickly applied with brush or cloth.
 Dries instantly, ready for scribing.
 Adheres perfectly to any clean, dry surface; no special preparation required.
 Not affected by oil, water, coolants, etc.—yet readily removed with Pen-Blu Remover.
 Will not blur, smudge, chip or peel.
 Lines remain sharp and highly visible throughout all normal shop handling.
 Low in cost, economical to use.



For full information on this NEW, BETTER layout dye, write for free descriptive bulletin.

PENINSULAR CHEMICAL PRODUCTS COMPANY 6795 E. NINE MILE RD. VAN DYKE MICH The CRITERION
Carbide Tool
Grinder

GREATER PRODUCTION CAPACITY

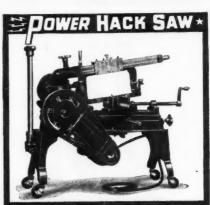
Provides positive rapid adjustment to meet the rigid requirements of production tool manulacturing. Built for continuous service. Adjustable coolant system. Large work tables instantly adjustable without wrenches or other tools. One-third H.P. balanced precision bearing motor completely enclosed and radially mounted in rubber. Standard equipment: One 60 and one 100 gril 7" dia. steel backed silicon carbide wheels. Ideal for metal bonded or Resinoid bonded dimond wheels.



Order from your dealer or write direct. Request literature. No obligation.

CRITERION

MACHINE WORKS
BEVERLY HILLS, CALIFORNIA



Low Priced Portable

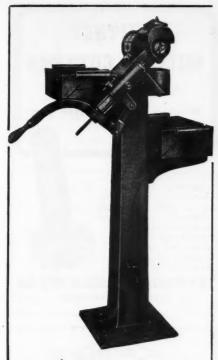
Self-Contained Sturdy

Ready to Work - Economical EXPORT DEPT.

NEW YORK 4, N.Y.

Write for Bulletin No. 300

MILLER-KNUTH MFG.CO. OMAHA NEB



# **SCREW HEAD SLOTTER**

1/8" to 1/2" Screw Body Diameter. Will not injure screw threads.

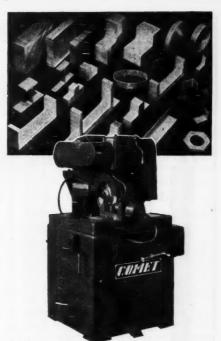
Easy to Operate
High Production

ALSO MAKERS OF

ROTARY TABLES — MILLER VISES
MULTIPLE SPINDLE CENTERS
SCREW MACHINES

Write for Bulletin

JOHN B. STEVENS INC. 482 CANAL ST., NEW YORK 13, N. Y.



# Cuts METAL FASTER More Accurately

If you require accurate, high-speed cutting of non-ferrous metals and other materials, here is your machine. Cuts by smooth, fast, milling action. Pneumatic hydraulic feed is coordinated with speed of cutting blade. Vise synchronized with action of ram. No vibration because of weight distribution. Has 4 speed transmission and variable feed mechanism. Built-in coolant system. Properly operated, blade breakage is eliminated. Write or wire for free literature.

CONSOLIDATED MACHINERY & SUPPLY CO., LTD. 2031 SANTA FE AVE., LOS ANGELES, 21, CALIF.

AUTOMATIC CUT-OFF MACHINE

12" LONG HIGH SPEED STRAIGHT SHANK H.S. DRILLS H.S.

		Price
10"	Size	Each Net
12"	1/8"	 \$1.86
	9/64"	 1.95
	5/32"	 2.06
	11/64"	 2.15
	3/16"	 2.25
	13/64"	 2.34
	7/32"	 2.45
	15/64"	 2.54
	1/4"	 2.63
	17/64"	 2.73
	9/32"	 2.82
	19/64"	 2.93
	5/16"	 3.02
1/2	21/64"	 3.18
	11/32"	 3.36
	23/64"	 3.56
	3/8"	3.75
1 1	25/64"	 3.95
	13/32"	 4.14
		 4.29
	27/64"	 4.49
/-	7/16"	
AA	29/64"	 4.62
1	15/32"	 4.76
10	31/64"	 4.85
12	1/2"	 4.88

Satisfaction Guaranteed

# EASTERN TOOL SUPPLY CO.

176 GRAND STREET New York 13, N. Y. SEND FOR OUR CATALOGUE

# WHITNEY MILLING CUTTERS

for Uniform Seating of Whitney Woodruff-type Keys



The Whitney Chain & Mig. Co.



# CONTINUOUS HINGES

Manufactured by

AUTO MOULDING & MFG. CO.

WRITE FOR STOCK LIST
2326 S. CANAL ST. CHICAGO 16

# Abart Speed Reduction Tables

— From the precise duties of 1/50 horsepower—To the requirements of 417 horsepower — And

slow speeds from high speed motors.

Abort SPEED REDUCERS

Over 75 types and sizes, worm, spur, and com-

binations. Horizontal and Vertical. Input and output as desired. Send for catalog. Abart GEARS. No stocks. Send B/P.



Type DW



Type CA



Type A

Alvant

GEAR and MACHINE CO., 4819 W. 16th St., Chicago 50, III.

### BRAND GUARANTEED PRECISION TOOLS

### **Brand Telescope Gages**



# International Inside Micrometers



Made in 2 sets:
No. 4A 1½ to 12"
with case and
handle ..\$11.00
No. 4B 1½ to 6"
with case and
handle ..\$8.50
Immediate Delivery

Also M & L Precision Tapper—Sine Plates and Bars Universal Angle Plates—''Handy Knurlers.''

BRAND TOOL & SUPPLY CO., 502 W. WASHINGTON, LOS ANGELES 15, CALIF.



How to insure against spindle misalignment caused by making hasty set-ups for tapping and reaming is now very simple. Instead of using an ordinary tool holder, use a Ziegler Floating Holder which automatically overcomes any misalignment up to 1/32" radius or 1/16" diameter.

Its patented design enables it to take any and all end-thrusts. Always floats freely. No friction or cramping even under the severest tool-driving strains. No wonder it's the favorite in leading shops throughout the nation.

It may be the solution to your production problem. You will find that it will eliminate the spoilage losses that are common with other types of holders.





W. M. Ziegler Tool Co.

1924 TWELFTH ST. DETROIT 16, MICH.



# The New



# **AUTOMATIC FEED CONTROLS**

for LOGAN and ATLAS lathes

operate the half-nuts
MECHANICALLY
Stops carriage INSTANTLY at any pre-determined
point.

FAST • S

SAFE • ACCURATE

Only \$22.50—Dealers or

INDEPENDENT SPECIALTIES

152 W. 75TH ST.

CHICAGO 21, ILL.

# ILLUMINATED INSPECTION



LENOX Instruments explore the dark holes of industry—guns, turbine rotors, hollow shafts, tubes, tanks, well drill pipe, cartridge cases, etc.

LENOX INSTRUMENT COMPANY

# **BORESCOPES**



U.S.A. Pioneers. Twenty years. Let us solve your problem. Give diameter and length of cavity to be inspected.

2010 CHANCELLOR ST. PHILADELPHIA 3, PA.

# PLASTIC moulds



# EXPERIMENTAL WORK

All Types of Precision Die, Tool and Gauge Work.

DESIGNERS and BUILDERS

Phone Sales Mgr., Hogarth 9458, Detroit

BONE TOOL & GAUGE CO.

9914 Freeland Ave. Detroit 27, Michigan

378

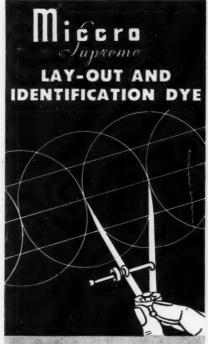


We'll solve that tricky problem. We'll make tools that will cut your manufacturing costs to the bone; and if you want to get rid of all your headaches we'll make the parts for you too!

DROP US A LINE TODAY... (or send your prints for quotation). We'll be glad to discuss your own particular problem with you if it involves tool or product design—or tool, machine or product manufacture. Consultation places you under no obligation.

FLORIAN MANUFACTURING CO.





# IN (12) COLORS:

136-Red . . 134-Blue . . 103-Green 104-Black . . 141-Cerise . . 137-Violet 138-Tangerine . . 139-Chartreuse \*142-Purple . . 140-Aquamarine 121-Brown . . 101-Yellow \*Shipped unless otherwise specified.

### USED FOR:

Tool, Die, Pattern or Template Layout on Metal.. Quick Identification of Bar Stock, Sheet or Strips, Tools, Dies or Parts.

Dries Instantly - Easily Removed

Circular giving tull information and prices sent upon request

MICHIGAN CHROME & CHEMICAL COMPANY

6340 E. Jefferson Ave. . Detroit 7, Mich.

45



# CHASERS

The largest exclusive manufacturers of chasers

### NOW

OFFERS ALL TYPES OF CON-VENTIONAL DIE HEAD AND COLLAPSIBLE TAP CHASERS WITH GUARANTEED DELIV-ERIES TO MAINTAIN PRO-DUCTION SCHEDULES.

# US SOLVE YOUR THREADING **PROBLEMS**





# CHAMBERS CHASER CO.

13-19 W. WOODRUFF ST. HAZEL PARK, MICH.





# **GEARS GOOD GEARS ONLY**

All Kinds—Any Quantity AT THE RIGHT PRICE

THE CINCINNATI GEAR CO. Wooster Pike

Cincinnati, Ohio



75% through use of the

New Advance Clamps (the only T-slot clamps) Clamp directly over work. For use on all machines with T-slots. Standard and Heavy-

Duty type. Write for circulars.

ADVANCE MACHINE WORKS 3727 Weisser Park Fort Wayne, Indiana



### GRAY TURRET HEAD METAL CUTTER OR NIBBLER



GRAY, Originator of First Practical Metal Cutter or Nibbler

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Air-craft Parts, Aircraft Tub-ing, Sheet & Plate Shops.

GRAY MACHINE CO. Box 596, Philadelphia, Pa

SEND US YOUR PRINTS FOR Quotations

THREAD GRINDING BROACHING MAGNETIC INSPECTION







machines by every ma-chine tool which leaves

burrs. Grinds, finishes both outside and inside cut-out openings. Im-mediate delivery in most cases. Write for the informative Money-Saving circular now.

MEAD Specialties Co.

4114 N. Knox Ave.

Dept. A-95 CHICAGO 41, ILL 0 =

For METAL-PLASTIC-WOOD





### ANTI-FRICTION COMPOUND

SERVING INDUSTRY FOR 30 YEARS

Cools hot bearings • Solves toughest lubricating problems • Saves wear on moving parts • Works wonders with cutting oils • Packed in 5-10-25-50-100 lb. containers. Ask for Free Sample. Immediate Shipments from Stock!

SCIENTIFIC LUBRICANTS CO. 3469 N. Clark St. Est. 1914 Chicago 13, III.



Comes in Blue, Black, Orange, Red. Drys fast. Oil resistant Won't chip, crack or flake off. Also ideal as marking dye. Get 8 oz. brush-in cans, pts., qts., drums. SAMPLE FREE!

TAMMS SILICA COMPANY
228 N. LeSelle St. • Chicago 1, III.

# DESMOND GRINDING WHEEL DRESSERS



DETROIT Bevel

Desmend Hox Bresser



Desmand Heavy-Duty Dresser



Our Desmond Huntington Cutters are made in all sizes.



**Desmond Huntington Dressers** 

We manufacture only complete line of dressers and cutters on the market, and will be glad to send samples for trial. Write for copy of our new catalog and name of your nearest jobber.





# Grobet ED COUNTERSINKS

TWIN FLUTED COUNTERSINKS

Patent Pend.









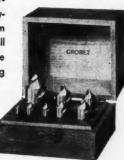


Twin-fluted for precision work. They give a very smooth micro-inch finish, but are readily adaptable for coarser work. They are fast cutting. Recommended for countersinking, in aluminum, magnesium, steel, plastics, plywood, etc. Perfect chamfer is guaranteed, free from ridges or chatter-marks—accurately uniform in all cases. Made of high speed steel, ground for close tolerances after hardening, and fulfill the exacting Grobet standards of accuracy.

GROBET TWIN FLUTED COUNTERSINKS are obtainable in given sizes or offered in a strong box of polished wood containing eight countersinks to the set (two in duplicate sizes).

write for Discounts and Bulletin No. 451

At present, made in 6 sizes from ½ to 1"; in 41, 45 and 30 degree angle c/t.



# GROBET FILE CO. of AMERICA

**421 Canal Street** 

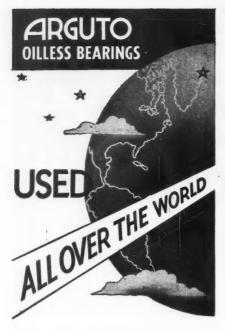


New York, 13 N. Y.

IMPORTERS OF GROBET SWISS FILES

MIRS. OF GROBET ROTARY FILES

Plants: New York . Chicago . Los Angeles



... IN MANY DIFFERENT APPLICATIONS

"OUTWEARS THE BEST BRONZE METAL"





FULL PROTECTION - LIGHT WEIGHT

LONG WEAR

SLEEVES, GLOVES WORK APRONS



Provide full protection to workers from troublesome dermatitis induced by industrial irritants.
Only 1/7th the weight of conventional protection garments - makes for wearer's comfort and freedom of movement-

reducing fatigue. NU-LITE sheds and resists water, oil, gaso-line, strong acids, alka-

lis, degreasing an d plating solutions. Let us show you how NU-LITE's low cost pro-tection features can boost production in your shop. Samples furnished for approval.

Safety Equipment, Production Alds and Packaging Specialties

NULITE PLASTICS DEPT. MMS VERONA, N. J.



# E-lectrically SPEAKING

Sizes shown here are 1/4" in diameter up to 11/2" in diameter — all high speed steel.

COMMUTATOR
SLOTTING SAWS
MICA UNDERCUTTING SAM
MADE BY

Are Doing a Big Job!

The Circular Tool Company, one of America's largest manufacturers of these types of saws which are today "doing a big job" wherever electrical motors for automotive, air and marine use are produced, also offers a complete line of specialized metal cutting saws built by perfectionists for today's and tomorrow's exacting operations.

CIRCULAR TOOL CO., INC.

PROVIDENCE 5, R. I

CHICAGO PHILADELPHIA NEW YORK DAYTON CLEVELAND
LOS ANGELES ROCHESTER INDIANAPOLIS DETROIT ST LOUIS

ed nts. ght eckes ind

# **G&B CIRCULAR LEVELS**

**Indicate in All Directions** 



Send for Folder.

Geier & Bluhm, Inc. River & North Sts. TROY, N. Y.

# Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive—Last for 'years. Write for Circular.

NIELSEN TOOL &

1960 W. Eleven Mile Rd Berkley, Mich.



REGRIND THEM Used on tool and cutter grinders — surface grinders — even bench lathes. Taps sherpened after center is destroyed. No collets. Complete. No extras. Writel

BROACH KEYSEATER The Reading Bench Ma-

chine does not require bushings or guides. Very fast capacity from 1/4 to 3/6 cutter. Low first cest.

READING MACHINE COMPANY READING (CINCINNATI), OHIO



PROMPT DELIVERY.

RESHARPEN DULL TAPS

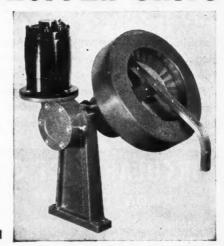
# **MOTORIZED HOPPER UNITS**

ADAPTABLE TO ANY MACHINE.

FEED BULLET CORES, SCREWS, PINS, WASHERS, BEARING ROLLERS, NUTS, RIVET, SPECIAL PARTS.

Send Samples for Information and Prices.

DETROIT POWER
SCREWDRIVER CO.
2807 West Fort St.
DETROIT 16 • MICHIGAN



386

# Keep Costs DOWN Quality and Production UP!



CARBOLOY



forgings, etc.

Tools for Roller Turners ("Box" Tools)

### **Greeving Tools**



Available in widths over .060" through.330" Tolerancesupto.0004".

# Shear Type Tools



For interrupted cuts on large forgings and castings.



Solid Carbide Guide Rings

For wear resistant uses on machines such as wire stranding machines. Increases life up to 50 times.

### Special-Purpose Standard Stock Carboloy Cemented Carbide



Reamer Blanks 11 Standard Sizes

# CARBOLOY COMPANY, INC.

11143 EAST EIGHT MILE BLVD., DETROIT
Sale makers of Carboloy Brand of Companied Carbides

CHICAGO · CLEVELAND · HOUSTON · LOS ANGELES · MILWAUKEE · NEWARK · PHILADELPHIA · PITTSBURGH · THOMASTON

Also stocked and sold by Loading Milt Supply Distributors, coast to coast.

### Masonry Drills

Drill concrete, brick, etc. 75% faster than old methods.

Diamond Impregnated
Grinding Wheel Dressers



3 sizes. For all grinding wheels.



General-Purpose Standard Carboloy Blanks

Style 1000 Style 2000 Sizes 1/16" to ½" thick.

# Lathe and Grinder



Casher &

(Up to 50 times longer life than steel.)

Carbide tips only.

Finished tipped centers (with

Finished tipped centers (with Morse, B & S, and Jarno Tapers).



Precision "Boring" tools for high quality finish. (You grind point to suit).

### Send For Free Catalog

32-page catalog GT-175-R contains prices and specifications of all standard stock and standard design Carboloy Cemented Carbide tools. Write for your copy today.



d Car-, Write copy

ARBOLOY TO BE ANKS



expanded connections to become loose or develop leaks.

★No electrolysis to cause corrosion, breakdowns, leaks, or heating failures.

So compare the GRID High Test Cast Iron Unit Heater with any unit heater on the market today. In all types of industries GRID Unit Heaters have

been installed for as long as 15 years, continuously operating without maintenance cost, and under all types of conditions, including corrosive atmospheres. New booklet that tells why corrosion destroys unit heaters-free upon request.



SEND FOR IT TODAY.

HEATING

SECTIONS

D. J. MURRAY · WISCONSIN

### QUICK and ACCURATE

No. 35 FLYNN MICROMETER OFFSET BORING HEAD HAS RIGIDITY PLUS A Large Range

2" OFFSET
34" bar or tool capacity. Bores 1/2" to 12" dia. holes. Write for catalog.

FLYNN MANUFACTURING CO. 437 Bates St. Detroit, Mich.







INSIDE — OUTSIDE — SCREW THREAD

Send for complete information



DY MANUFACTURING COMPANY 321 PINE STREET PAWTUCKET, R. I.

# The SUPER METHOD



# of TRIMMING FORMED PARTS

and performing a host of other metal cutting jobs!

The negligible down-drag and the ability of Tannewitz High Speed Band Saws to cut sheet metal from 90° to near 0 or 135° at tremendous speed make these machines ideal for trimming. Cuts can be made with perfect safety without using a rest of any kind.

Friction sawing with Tannewitz High Speed Band Saws also results in perfectly amazing time savings in the cutting of flat sheets, soft or hardened steels, armor plate, plastics, glass and many other materials. Whatever your cutting problem, chances are it can be done better and faster with Tannewitz Band Saws. Investigate this "Super" method of cutting.



Write for Your Free Copy FRICTION SAWING

Tannewitz

HIGH SPEED BAND SAWS

THE TANNEWITZ WORKS 4. MICHIGAN



# Johnson Adjustable Work Clamps

An all-purpose Clamp for lathes, milling machines, drill presses, and many other machines. Saves time and effort. Designed for speedy, accurate set-up and operating ease. Soon pay for their cost.

No. 1—%" Bolt. Capacity 1/2" to 2" from table or plate.
No. 2—%" Bolt. Capacity 1/2" to 2" from table or plate.
No. 3—3" Bolt. Capacity 3" to 41/2" from table or plate.

### Mfr's Agents: JOHNSON & TIERNEY CO.

P. O. Box 256, Peguannock, N. J.

Manufactured by W. E. JOHNSON CO., Pequannock, New Jersey

# **KEEP OUT DUST AND RUST**



Protect parts on storage or transit with tough Precision caps or inserts that fit. Sateguara threads and surfaces at every point!

PRECISION Dust Caps

### **Thread Protectors**

Spirally wound, acid-free. Shapes to fit any requirement regular or irregular. Send for samples and economical prices.

### PRECISION PAPER TUBE CO.

2051 W. CHARLESTON ST.

CHICAGO 47, ILLINOIS

AND INSIDE

# To Speed Victory! WE ARE READY TO SERVE YOU!



### **Cold Pipe, Conduit and Tube Bending Machines**

Twelve types to select from. Hand operated capacities 1/4 to 6" inclusive. Motor operated 1/2 to 8" inclusive.

A few of our More Than 12,000 Customers:

Bureau of Ships, Wash., D. C.; Henry J. Kaiser Co., Pacific Bridge Co.; Bethlehem-Hingham Shipyards; Hercules Powder Co.; Stone & Webster; E. I. Du Pont de Nemours & Co.; Westinghouse Elec.; General Motors; Henry Ford Co.

**Ouick Deliveries** 

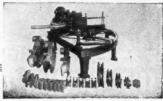


sombany INC.

Factory and Main Office: POULTNEY, VERMONT (Sales Office formerly: 37 Pearl St., Boston, Mass.)



Write Air Mail for printed matter



## GAGES OF PRECISION BY WOODWORTH

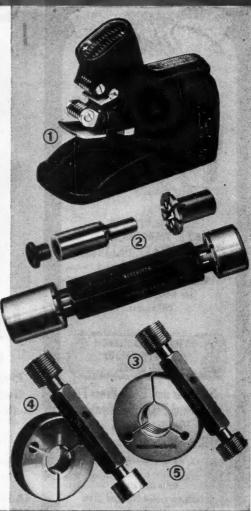
ALL the facilities of the N. A. Woodworth Company are directed to one objective . . . the manufacturing of precision gages and tools with the longest accurate life to give the user the lowest possible operating cost.

Increase your production efficiency with sustained accuracy by Woodworth.

\* . \* \*

- Speed up production and reduce costs with the Limitrol. The Limitrol Comparator Type Snap Gage checks errors involving pitch diameter, lead, taper, angle, out-of-roundness. It eliminates "feel" and reduces scrap. Write for Folder 44-L.
- Woodworth Carboloy Gages are free from distortions, stresses and strains. Woodworth's exclusive segmented shank compensates for the differences in coefficient of expansion between cemented carbides and steel, thus assuring a trouble-free bond between these two materials. Write for Circular 44-C.
- 3 Woodworth Durplate Gages are noted for their long life and great accuracy. The Durplate process is exclusively a Woodworth development and confirms the Woodworth slogan, "accuracy you can trust."
- 4 Woodworth gages of cast Stellite alloy are tough, high wear-resistant . . . have a service life many times that of steel. Gage life is increased from 10 to 20 times. Stellite Cast Alloy Gages are non-corrodible and non-magnetic . . . have a coefficient of expansion close to steel . . . with other desirable characteristics. Write for Folder 44-S.
- 5 Gages of Nawlide, a specially processed Woodworth alloy, are outwearing ordinary steel gages many times with no sacrifice in toughness,

ACCURACY YOU W CAN TRUST



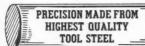
## WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 F. NINE MILE ROAD - DETROIT 20, MICHIGAN



A.S.A. STANDARD SIZES
FOR IMMEDIATE DELIVERY

WELCH Bushings have longer life which reduces your tooling cost.

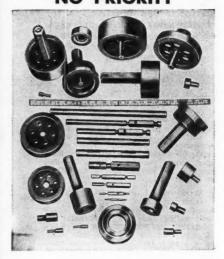


Headless and Head Press Fit Slip and Fixed Renewable Headless Liners A. S. A. Standards or to Your Specifications

> Write for Catalog Lists over 1700 Standard Sizes and Types

WELCH TOOL ENGINEERING CO.
CAPITAL 19101 . LOS ANGELES 41, CALIF.

## RECONVERSION GAGES



## In 48 Hours

#### (IN MANY SIZES)

Plug Gages, Ring Gages, Snap Gages (Adjustable and Solid) Built-up Gages, Flush-Pin Gages, Special Gages.

#### **Our Good Gages:**

Prevent Spoilage, Utilize Less Skilled Help Speed-Up Operations, Reduce Costs

#### EASTERN PRECISION GAGE CO. 318 Bayway Elizabeth 2, N. J.

We operate day-and-night and Sunday
Phone us at any hour
ELIZABETH 2-9519

Seld for illustrated folder-M



## Needle Point Diamonds

For truing fine grained or sharp edge grinding wheels

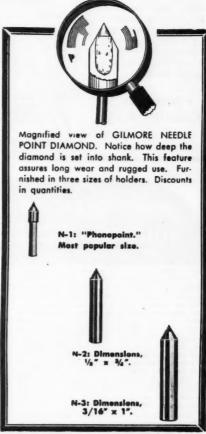
Four different angles of conical point. 60° and 75° points for every delicate use 90° and 120° points for general use. The narrow diamonds set in these stools stay reasonably sharp until completely used.



Write for NEW complete catalog on Diamond Tools for Precision Grinding.

## F. F. GILMORE & CO.

285 COLUMBUS AVE. BOSTON, MASS.



5,

lp

## BALANCING WAYS

Shops handling rotating parts find this simple, sturdy and thoroughly dependable device highly efficient for balancing and truing operations. It assures better work...saves time...saves labor. No leveling required.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.

Swing	Distance Between Standards	Capacity in lbs.
20 in. 40 in.	20 in. 30 in.	1,000
60 in. 72 in.	30 in. 66 in.	2,000 5,000
96 in.	88 in.	10,000

| Greatest|

Buy Bonds for Keeps

Write for BULLETIN 9-22



MILLING - DRILLING - BORING
ATTACHMENT --- Operations

Photo shows a special operation not suited to standard straddle mill set up but easily handled by means of a RUSNOK Milling attachment used horizontally on a standard milling machine, saving one machining operation and accomplishing greater accuracy in finished piece parts. Uses many types of cutters on a wide range of work. Easily mounted—tilts to any angle. Large size spindle (No. 9 B & 5 tapor). Takes 1/16" to 3/4" end mills. Large quill with 4" travel, counter balanced, hardened and ground. Six speeds 250 to 3000 RPM. Lever and worm feeds. 1/2 h.p. moter. Specially engineered by RUSNOK to meet modern demands for high speed, high precision, heavy duty end mill operations. Prompt delivery.

Write for illustrated circular and prices.

RUSNOK TOOL WORKS
4840 WEST NORTH AVE. CHICAGO 39, ILL.



You can reduce your present down-time and save production, costs and manpower by tooling up with longer-wearing TECO Cemented Carbide.

TECO Cemented Carbide produces more pieces between grinds because intense hardness gives it greater resistance to wear, while controlled toughness and uniformity make it more resistant to breakage. Result: Teco

Cemented Carbide stays on the job longer—causes fewer machine stoppages due to dull tool edges or broken tips.

Check these properties of TECO Cemented Carbide against your present cutting tools . . . on your own lathes, under your own conditions. Send us details of your operation. Or have a tool engineer discuss your needs. Catalog and price list on request.



## VIMCOLIGHT



## CANCELS OUT THE "SHADOW MENACE"

It's remarkable how glareless, clear, shadow-free VIMCOLIGHT conserves the EYE-POWER of machine tool operators. This modern, improved lighting helps cut down spoilage and steps up production because it reduces eye fatigue and strain. VIMCOLIGHT spotlights the work at exactly the desired angle and is quickly adjustable from one position to another. Inexpensive . . . easy to install . . . used as standard equipment on many leading machine tools.

VIMCO Manufacturing Co.
111 Chenango St. Buffalo 13, N. Y.

## NUMBERALL

## Multi-Wheel Numbering Machine Model 70



Model

The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20.

Model No. 70
Write for
Bulletin MS-70.

### ROTARY STAMP

(PATENTED)

Single wheel, for stamping on brass, aluminum, s of t steel, plastic and wood, with a single hammer blow. All figures on 1 wheel, entire alphabet on 2. One stamp replaces 12 individual, h and stamps. Characters from 1 to 3/8". Also with shank for press.



NUMBERALL STAMP & TOOL CO.

# PRODUCTO UTILITY PRESS

The most modern design of a screw press for every Tool and Die Room.

Tremendous power . . . plus advanced design, fits this press for a wide variety of work . . . makes it practically indispensable in the machine shop and tool room for these general uses:

- For shearing Punches and Dies in the Tool Room.
- For separating Punch and Die Holders on large liner pin Die Sets.
- For assembling and lining Punches and Dies.
- 4. For use as an Arbor Press.

It is also very efficient as a Straightening Press. Also often used for short broaching operations, pressing out pins from Die Sets, disassembling spindles or shafts from press fits in bearings, etc., because of its great power and the convenient provision for passing tools or work through the 3" hole in the bed. Cap. 50 Tons — Net Wt. 3500 lbs.



THE PRODUCTO MACHINE COMPANY

990 HOUSATONIC AVE.

DETROIT
3017 Medbury
INDIANAPOLIS
139 West 16th Street



BRIDGEPORT, CONN.

CLEVELAND
4747 Hough Avenue
LOS ANGELES
2168 E. Olympic Blvd.

NEW YORK, 197 LAFAYETTE STREET

thod

ged. ALL

all

pers,

ch

uced

ype,

ress of

for

ass,

and

sin-

ow.

n 1 al-

One

12

nd

racto ith

ess.

1945

## SAVES TIME — SAVES MANPOWER and **INCREASES Production!**

That what the PRECISION WIRE STRIPPER is doing today for hundreds of war production plants throughout the U. S.—AND IT WILL DO THE SAME THING FOR YOU if wire stripping problems now confront you.

In a twinkling, this ruggedly built precision instrument removes insulation from the ends of solid, stranded or multi-conductor cable and wire ur to a half inch in diameter AND IT DOESN'T REQUIRE A SKILLED OPERATOR.



Drop us a line now and we'll send you complete details on THE PERFECTION WIRE STRIPPER by return mail.

## WEBER MACHINE CORPORATION

Rochester 6. New York





## TO MEET Your SPECIFIC NEEDS!

If you require a complete range of plug gages, this Sav-Way Master Set is the perfect answer. It includes 147 plugs ranging from ½" to 1" in increments of ½ths. There are three plugs of each nominal size—standard, .0005 over, and .0005 under. All plugs are held to gage makers (X) tolerance lap finish, and are deep frozen before finish grind.

This complete set of 147 plugs and 4 handles is housed in three separate beautifully finished, solid walnut cases which fit together to form a single, compact unit. This permits the size range contained in any one tray to be used without removing the entire set from the tool crib.

NOTE: If your supply house has not yet stocked this Sav-Way kit, have them place your order . . . or place your own order direct for immediate delivery! BUT—not all shops require this full range of plug gage sizes; therefore, we have made it possible for you to buy any one or any two sections of this complete set, depending upon your specific requirements. Or, you can buy one unit and add other units later as they are required. Thus, for the first time, you can have the highest quality of plug gages to meet your needs exactly—and still make only a small investment.



DISTRIBUTOR TERRITORIES OPEN-Write for Details

BOX 117, HARPER STATION, DETROIT 13, MICHIGAN



Another manufacturer has switched to Capewell. This plant's war work is the production of shells. The hack saw operation is set up to cut, at one time, 11 pieces of 2½" diameter No. C1117 solid shell stock. Because this plant was looking for larger weekly production, with less shut-down time for blade changing, the officials ran a comparative test. The result: Capewell's Technite hack saw blade was found superior. Do you also wish to improve hack saw production? Simply talk to your local Capewell distributor.



THE CAPEWELL MFG. CO.



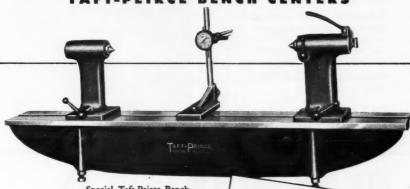
## ...and Save Material

The first job of a vise is to grip – Parker does it – with a vengeance. No slips to ruin costly jobs, bog down workers' time. Pinned-on, renewable steel jaws are but one feature. Others are solid, built-to-last construction and a safe, non-slip handle. Ask your distributor for details. The Charles Parker Company, Meriden, Connecticut.

PARKER VISES © America's Oldest

## INSPECTION

is Easy, Rapid, Accurate with

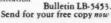


Special Taft-Peirce Bench Center with 15" swing. Equipped with T-P Dial Indicator Mounting and Bracket.

And bere's why: One of the hardened steel centers is held in a sleeve pressed into the head. The other is held in a spring-actuated sliding sleeve which facilitates centering or removal of the work and — by placing the lever over the top of the tailstock — permits work to be held and spring-center withdrawn with the same hand. This spring center can be locked in position by a convenient lever clamp, when indicating heavy work. No other bench center is so easy to use.

Taft-Peirce Bench Centers are made in 18" and 36" standard models, and special models are available on order. Additional fixtures include sine bar indexing head with face plate, gear rolling fixtures, spur and helical gear attachment, bevel gear attachment, worm gear attachment. Send for new publication LB-5453.







The TAFT-PEIRCE Manufacturing Company
WOONSOCKET, RHODE ISLAND

1945

## SAUE HANDS WITH STRANDS

#### ENCLOSURE SAFGUARD

#### and Increase **Production**

Made for blanking, piercing, notching, cut-offs, chute and automatic feeds.

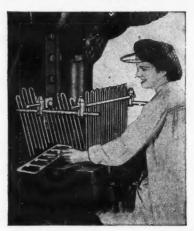
Adjustable to all sizes of dies. Gates can be tilted inward close to die. Staples may be moved up or down to straddle any obstruction.

Transparent Shields made for front or sides.

#### STRAND MFG. CO., INC.

SAFETY ENGINEERS

611 West Lake Street Chicago 6, III.



SEND FOR CIRCULARS ON STRAND **ENCLOSURE AND SWEEP SAFGUARDS** 

## DEARBORN

Automatic

### CHUCKING and INDEXING FIXTURES For Fast Milling and Drilling

Model C was designed to meet the demand of faster machining and accurate indexing of small pieces on bench and hand milling machines.

#### SPECIFICATIONS:

	Model B	Model C	
Height to top of collet	5%"	34"	
Center of collet to back of fixture	34"	2"	
Collet capacity	l" round	%" round	
Cuts per hour on free machining material	1000	1500	

Work held by automatically opening and closing collets. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces

WRITE FOR FOLDER.

J.W. DEARBORN ANSONIA,



MODEL C





## MORE THAN A TRADE-MARK—It's PRODUCTION INSURANCE FOR YOU

★ In 16 years of designing and building tools for Industry, we've learned many things of value to our customers.

For one thing, we've learned the technique of engineering PEAK PRODUCTION CAPACITY into every tool we build.

We cut out all needless and expensive frills. Tools bearing our trademark are built to STAY ON THE JOB of getting work out F-A-S-T!

If you are interested in tools which provide PRODUCTION INSUR-ANCE we invite your inquiry.

## QUALITY TOOL & DIE CO.

Manufacturers of "Quality" Products

401-15 NORTH NOBLE STREET, INDIANAPOLIS 2, INDIANA







## for MOUNTING YOUR VISE, FIXTURE or used as

#### ANGLE PLATE

Holds or mounts work rigidly, for checking, milling, drilling, shaping, grinding, boring, welding and pattern making.

Quick, accurate adjustment to any desired angle, set with protractor. Easy to use. Three standard sizes. Send for literature and prices.

Desirable territory still open for live representative.

METRO-VISE CO. 274 STEPHENSON BLDG. DETROIT 2, MICHIGAN A. S. A. STANDARD
PRECISION
DRILL
JIG

BUSHINGS From STOCK



#### 5 STYLES

- Headless Press Fit Bushings
- Head Press Fit Bushings
- Fixed Renewable Bushings
- Slip Renewable Bushings
- Headless Liners

Also a complete line of accessories.

SEND FOR CATALOG



ACCURATE

#### COMPANY

403 NORTH AVE. • GARWOOD, N. J.

Helping MACHINERY Serve America Better!



### A Major Advance in SPEED MEASUREMENT

#### IDEAL Electric Tachometer

The quick, accurate determination of rotating speeds has become an increasingly important problem and IDEAL has helped in the solution with the IDEAL Electric Tachometer. Effective for checking all shaft and belt speeds. Also equipped with wheel for measuring surface speed in feet per minute. This self-energized tachometer is electrically and mechanically sturdy with rugged, reliable, accurate meter. Two ranges—0 to 2500 RPM and 0 to 5000 RPM. For use as conventional tachometer or for permanent mounting.

Other IDEAL Machine Tool Products include: Live Centers, Magnetic Chucks, Demagnetizers, Metal Etchers, Grinding Wheel Dressers, Balancing Ways, Variable Speed Transmissions, and Electric Cleaners. OVER 100 PRODUCTS TO HELP MACHINERY SERVE BETTER

## IDEAL Live Centers Speed Production



Handle heavier loads—permit deeper cuts at higher speeds because they rotate with the work. The special bearing construction assures accurate turning for precision jobs. Four inserts are easily and quickly interchangeable for centered or uncentered work. Accepted as standard in all leading tool and machine shops.

FREE—Write for IDEAL Machine Tool Catalog

IDEAL Sycamore

### MODEL No. 263-A

### WELDEX ELECTRONICALLY TIMED SPOT WELDER

3 K. V. A.

220 Volts

60 Cycle

Single Phase

Air Operated

**Bench Type** 



Foot-Switch Operated Air-Valve Solenoid Free-Cutting

Built-in Electronic Timer Adjustable Pressure Switch

For information and prices of spot, seam, flash and butt welders write

WELDEX INCORPORATED

7326 McDonald Ave., Detroit 10, Mich.

### THE "FORM - MASTER"

#### ANGLE and RADIUS DRESSER

A sturdy, quality instrument designed by form-grinding specialists to dress both angles and radius at low cost. Two ½ ct. diamonds and instrument case included—\$150.00 complete.

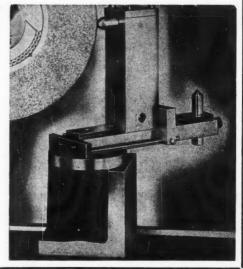
### *<u>Peatures</u>*

- Large range
- Chatterless and dustproof
- .0001" accuracy obtainable
- Simple to operate
- Reasonably priced

Call your supplier or write

J. & S. TOOL CO.

477 Main St., E. Orange 5, N. J.



## SMASHING TAPPING RECORDS!



Thousands of shops report unusual production records with Procunier Tapping Heads because these remarkable heads are built to stand up under the toughest production grind. The exclusive advanced design of the new Procunier Tapping Heads assures you accurate tapping at high speeds with automatic protection for taps! Tap is driven by a double-cone, cork-faced friction clutch which automatically regulates tap driving power by pressure applied through the drill press spindle. Operators can quickly detect full or loaded taps by the

"feel," or pressure on the clutch required to drive them thus avoiding needless tap breakage. With this sensitive Procunier smooth operating friction clutch, bottom tapping is as simple as through tapping, since the clutch instantly slips should the tap strike bottom or stick due to tap

loading.

#### External Threading

Standard Procunier Tapping Heads can be equipped for external threading. Produce accurate work and increase output.

#### Send for Bulletin

giving full details, description and prices on complete line of Procunier Precision Tapping Heads to meet all needs. The new Tru-Grip Tap Holder—and also the full line of Procunier Universal Tapping Machines.

DD	nr	TT BY	TPD
FN	UU	UM	IER

SAFETY CHUCK CO. 12 S. Clinton St.

CHICAGO 3, ILL.

PROCUNIER SAFETY CHUCK CO., 12 S. Clinton St., Chicago 3, III.

Send me bulletins on: 

High Speed Tapping Heads Tru-Grip Tap Heiders 

Universal Tapping Machines.

Name .....

Address ......

Sharpens saws in gangs up to 33/4" thickness

TAINS DIAMETER OF PLUS OR MINUS .001 OF ENTIRE LOT . . .

Automatic Circular Saw Grinder 57 T designed for sharpening milling cutters, slitting and screw slotting saws in gangs. A group of 250 saws .015" thickness can be sharpened at a single setting. Adjustable to saws from 2" to 8" diameter with tooth spacing from 18 points up to  $1\frac{1}{4}$ " from point to point.

Write for Bulletin 57T



THE WARDWELL MANUFACTURING CO. 3166 Fulton Rd., CLEVELAND 9, OHIO

## HALL WELL

shop equipment

COMBINES

UTILITY and NEATNESS



Fig. 1734

The "Hallowell" DeLuxe Shop Furniture of Steel combines smart looks with sturdy construction and up-to-date utility.

Interchangeability of shelves, cabinets and drawer units is also one of its good features, and offers a wide choice of styles and practical combinations.

For more information, write for the Catalog of "Hallowell" Shop Equipment of Steel.

OVER 40 YEARS IN BUSINESS

#### STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 556
Boston, Detroit, Indianapolis, Chicago, St. Louis, San Francisco



## TEST A WESTCOTT

. against any Chuck you are using



Every Westcott part is built stronger than it has to be. We could make the body lighter, the jaws thinner, screw carrier bearings single instead of double. And the chuck would be still strong enough for all your needs, maybe. But there will never be any "maybe" about a Westcott. When a chuck quits, production quits. That's why we say—TEST A WESTCOTT.

WESTCOTT—Precision manufacturers since 1872.



SEND

for Catalog 600.

Westcott Chuck Co. 728 E. Walnut St. Oneida, N. Y.

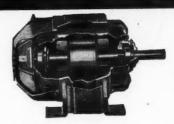


PRECISION · DEPENDABILITY · SERVICE

## Speed PRODUCTION UP TO 25% WITH

## MOTORS AND DRIVES

FOR LATHES • SCREW MACHINES
MILLING MACHINES • OTHER
STANDARD MACHINE TOOLS •





#### PROMPT DELIVERIES

In most cases we can deliver within three or four weeks. And that means early speed-up of your production, thanks to modernization of your present equipment. With Torq drives and motors you may speed production up to 25%, and make the change-over so easily you lose no valuable production time in waiting. You will be prepared for post-war with completely modernized equipment.

**ELECTRIC MOTORS:** Totally enclosed, fan-cooled, anti-friction bearings.

TORQ-QUA-MATIC DRIVES: 4 selective speeds, 1 to 15 H.P., alloy steel gears, anti-friction bearings. Proven design . . . improves production up to 25%.

#### NOTE THESE LEADING USERS

Listed here are a few of the leading American War Plants which successfully use Torq Motors and Drives: White Motor, Cleveland Cap Screw, Cutler-Hammer, Republic Stamping, Valley Mould & Iron, H. B. Sacker Mfg. Co., Thompson Products.

Write for descriptive catalog.



THE TORQ ELECTRIC

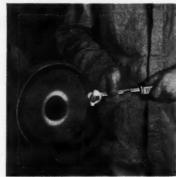
6605 CARNEGIE AVE.



MANUFACTURING CO.

## The Best IN STEEL TREATING PRODUCES The Best IN GRINDING WHEEL DRESSER CUTTERS

PROPER heat treating is the secret of long life and efficient operation in grinding wheel dresser cutters. Vincent cutters are made of a special analysis steel and heat treated in one of the country's largest and most complete heat treating plants by the exclusive Vincent Process. This process was especially developed by Vincent heat treating experts to provide the exact degree of hardness and toughness required for this use. The result is a clean dressing cutter that will not break or mush over under the toughest operating conditions.



Your distributor carries a full line of Vincent-

Huntington New Improved Dressers and Cutters for every hand dressing operation. Call

him today or write directly to the factory for complete specifications. Remember that a regularly dressed grinding wheel does a better job and lasts longer.



HUNTINGTON NEW IMPROVED

GRINDING WHEELS
DRESSERS and CUTTERS



Vincent

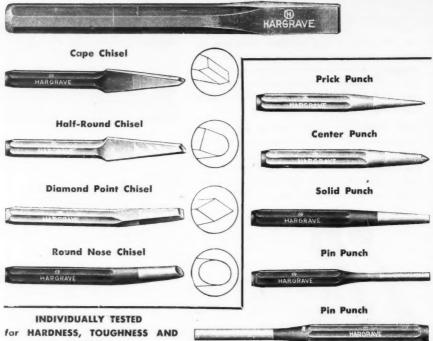
STEEL PROCESS

2434 BELLEVUE AVE . DETROIT 7, MICHIGAN

10

## HARGRAVE Chisels and Punches Individually TESTED

Cold Chisel



FREEDOM FROM FLAWS

All Hargrave Chisels and Punches are trip-hammer forged (not drop forged) from our special analysis steel. Each tool is individually tested to insure longer life and superior performance.

> WRITE FOR CATALOG showing the complete line of Hargrave Clamps, Chisels, Punches, Brace Wrenches, File Cleaners, Washer Cutters, etc. THERE IS AN INDUSTRIAL DISTRIBUTOR STOCK NEAR YOU.

## The CINCINNATI TOOL CO.

4051 MONTGOMERY ROAD

CINCINNATI 12, OHIO





### GROBET FILE CO. of AMERICA

421 Canal Street

New York, 13 N. Y.

Plants: New York • Chicago • Los Angeles

nd





For speed and economy in cutting metals, be sure always to select the type of blade that is absolutely right for the material you are handling and the cutting job you have to do. That right blade—whether for sawing lightest sheets or hardest alloy bars, by power or by hand—is always to be had in the Griffin line... Every blade uniformly dependable, backed by the progressive experience of one of America's very oldest manufacturers of hack saws.

GRIFFIN HIGH SPEED STEEL—Cuts toughest alloys—stainless, chrome, nickel, etc. Power and hand sizes. GRIFFIN MOLYBDENUM HIGH SPEED—For highly economical production cutting of all but very hardest alloys. Power and hand sizes.

GRIFFIN SOFT CENTER—An exclu-

sive Griffin development. Center soft but TOUGH; teeth and back hard-tempered for endurance. Most economical general-purpose blade. GRIFFIN NON-STRIP — For cutting thin sheet metal, tubing, etc. Special temper protects teeth from breakage. Write for FREE descriptive folder.

**General Sales Agent** 

JOHN H. GRAHAM & CO. Inc. 105 Duane Street, New York 8, N. Y.

## GRIFFIN

Hack Saw Blades

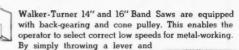
MADE BY G. W. GRIFFIN CO., FRANKLIN, N. H. - 1880-1945.



High Speeds



YOU GET BOTH IN
WAKER-TURNER
4-16 INCH BAND SAWS



engaging a pin, the gear train is disconnected and the Band Saw converted into a direct drive machine—with higher speeds for nonferrous metals, plastics and wood.

Walker-Turner Band Saws have a speed range from 61 to 5300 s.f.m. Blade tensioning devices have spring cushions to absorb shocks. Heavily-ribbed, carefully-machined tables tilt to 45°. Send today for latest catalog. Price (with gear unit) \$127.50 (less base and motor) F.O.B. Plainfield (Slightly higher west of Rockier and Canada)

WALKER-TURNER COMPANY, Inc., PLAINFIELD, NEW JERSEY

walker-Turner COMPANY, INC. PLAINFIELD, O.J.

## MACHINE TOOLS

DRILL PRESSES - HAND AND POWER FEED . RADIAL DRILLS METAL-CUTING BAND SAWS . POLISHING LATHES . FLEXIBLE SHAFT MACHINES RADIAL CUT-OFF MACHINES FOR METAL . MOTORS . BELT & DISC SURFACES



High Production - Money Making
MULTIPLE SPINDLE DRILLHEADS



ped

the

ing.

THRIFTMASTER PRODUCTS

THOMSON INDUSTRIES, INC.

29 05 Review Avenue - Long Island City I - New York





"AIRGRIP" Cylinders cut costs by big time savings. Patented double ball bearings permit speeds formerly impossible. Wear automatically taken up by air pressure.



#### "AIRGRIP" Chucks

Step up machine output with "AIRGRIP" Chucks' two-fisted gripping—air locking power plus a 2-way cam-wedge locking power which locks jaws mechanically when gripping either externally or internally.



## "AIRGRIP" Non-Rotating Cylinders

For pulling ... pushing ... lifting ... controlled, safe, smooth, dependable power! Heavier walls — 9/16"—require no tie rods—either end of cylinder removable.

#### OTHER ANKER-HOLTH COST REDUCERS

Air-operated Collets, Arbors, Mandrels, Drill Press Chucks, 2- and 3-jaw Finger and Compensating Chucks, Lubricating Assemblies, 3- or 4-way Air Valves (hand or foot operated), etc. Also Hydraulic Power Units and Fittings.

Representatives in all principal cities.

Write, mentioning products on which you desire bulletins.

Anker-Holth MFG. COMPANY

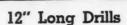
2731 Conners Street

Port Huron, Michigan

### HIGH SPEED STEEL, STRAIGHT SHANK

## TWIST DRILLS

Extra Length



Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net
1/8	12	9	\$1.50
9/64	12	9	1.50
5/32	12	9	1.50
11/64	12	9	1.50
3/16	12	9	1.50
13/64	12	9	1.60
7/32	12	9	1.60
15/64	12	9	1.75
1/4	12	9	1.75
17/64	12	9	1.85
9/32	12	9	1.85
19/64	12	9	2.00
5/16	12	9	2.00
21/64	12	9	2.25
11/32	12	9	2.25
23/64	12	9 .	2.50
3/8	12	9	2.50
25/64	12	9	2.75
13/32	12	9	2.75
27/64	12	9	3.00
7/16	12	9	3.00
29/64	12	9	3.25
15/32	12	9	3.25
31/64	12	9	3.25
1/2	12	9	3.25

### VICTOR MACHINERY EXCHANGE, INC.

251 CENTER STREET Phone: CAnal 6-5575 NEW YORK, N. Y.

5

me os-

er! tie



This "AMERICAN SWISS" File user's statement expresses in one sentence what every file user wants.

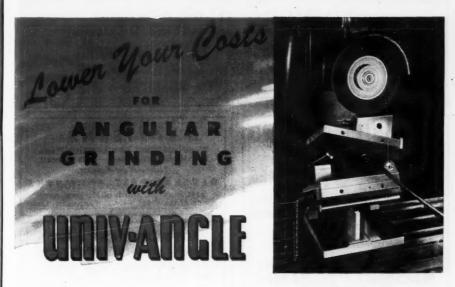
This comment is typical of reports we receive from machine shops all over the country. For best results and lowest costs on intricate or precision filing work, you are SAFE when you standardize on "AMERICAN SWISS" Files... made by a concern that has specialized on the manufacture of Swiss-Pattern Files for more than 40 years.

Buy From Our Distributor

American Swiss File & Tool Co., Elizabeth 1, N. J.

ask for them By NAME American Swiss & \*\*

SWISS PATTERN FILES



UNIV-ANGLE will give you faster, more accurate set-ups on both single and compound angle work. Angle determination is by the sine bar method, the most accurate method known. The UNIV-ANGLE itself is built to the closest limits assuring a set-up of utmost accuracy. Work is held magnetically, gripped firmly but without distortion, and released instantly.

UNIV-ANGLE consists of two units, one magnetic and one non-magnetic. These may be used singly or in any combination. A right hand set-up can be switched to left hand in a few seconds. There are hundreds of places in every tool room where UNIV-ANGLE can save its cost in a short time. Write today for complete information and prices.

of

#### SAVE TIME ON INSPECTION and JIG BORING TOO



Non-magnetic units are usually used for inspection and jig boring. UNIV-ANGLE units may be purchased separately and, since



all surfaces are ground and lapped to precision limits, any two units can be used together to obtain an accurate compound angle.

PRECISION BUILT BY THE MANUFACTURERS OF THE MAGNA-SINE



## SERVICES DIRECTORY

GRINDING • STAMPINGS • TOOL and DIE WORK MACHINE WORK • CASTINGS • HEAT-TREATING FORGINGS • EMPLOYMENT • BUSINESS • ETC.

## PRECISION GROUND GEARS CAMS THREADS SPLINES

Excellent facilities for grinding gears, cams, threads and splines on a contract basis.

SEND BLUEPRINTS FOR ESTIMATE

## HARTFORD SPECIAL MACHINERY COMPANY 300 HOMESTEAD AVE.

Hartford, Conn.

#### CENTERLESS GRINDING

Straight, Cylindrical, Shoulder, Profile, and Multiple Diameters . . . Ground Taper Plus Screw Machine Products. Heat treated and ground if necessary. Improved and expanded facilities insure prompt and accurate service. Send blueprints or samples for estimates.

PORTER MACHINE CO.
3139 Enyart Ave., Oakley, Cincinnati, Ohio

#### PATTERNS

Wood and Metal — also Match Plates. For all kinds of castings—large or small. Estimates on Request.

#### GENERAL PATTERN WORKS

2231 Buck St., North of Harrison Ave.
Phone MAin 4751 Cincinnati, Ohio

#### AUTOMATIC AND HAND SCREW MACHINE PRODUCTS

... up to 2" diameter — any material — small or large quantities. Prompt service.

IMSANDE SCREW PRODUCTS CO.

3517 Cardiff Ave., Oakley, Cincinnati, Ohio

#### CENTERLESS GRINDING

**SINCE 1925** 

CINCINNATI
ICE PICK & TONG MFG. CO.

118 BURROWS ST. . CINCINNATI, O.

CICION CDINDING GRIND THE

Eastern Centerless Way

Our new plant with increased facilities assures

#### PROMPT SERVICE

Eastern Centerless Grinding Co. 470 Tolland Street East Hartford 8, Conn.

### A COMPLETE

### PRECISION GRINDING

SERVICE

CENTERLESS GRINDING INTERNAL CYLINDRICAL GRINDING

EXTERNAL CYLINDRICAL GRINDING BLANCHARD SURFACE

GRINDING

PLAIN SURFACE GRINDING THREAD GRINDING

Send Blueprint Sketch or Samples for Quotation



ACE MANUFACTURING CORP. 1235 E. Erie Avenue Philadelphia, Pa.

#### **BAKELITE SILENT GEAR SERVICE**

ALL SIZE BLANKS IN STOCK.

Teeth Cut To Your Specifications.

Prompt Delivery. Write for quotation.

GREAVES MACHINE TOOL COMPANY

2009 Eastern Avenue

Cincinnati, Ohio

### CENTERLESS

GRINDING

Send Blueprint for Quotations

FOULK ENGINEERING CO. 4208 Airport Road Cincinnati 26, Ohio

## From Simplest to Most Exacting Jigs, Gauges, Tools, Fixtures. Designing and Engineering. Light Manufacturing.

Light Manufacturing.
Thirty Years of Service

SCHMIDGALL MFG. CO.

307 Cass St.

Pooria 2, III.

#### SMALL TAPS, DIES AND PARTS

Small carbon steel taps and elies in special sizes with threads up to 160 per inch, and numbered sizes in No. 0, No. 1 and No. 2, available on short notice. Small threaded or turned parts made to order on sensitive hand machines.

Write us about your needs.

J. I. MORRIS CO., Southbridge, Mass.

## GEAR MANUFACTURERS SPIRALS BEVELS WORMS

Quotations promptly made.

## SPLINE AND GEAR MACHINE CO.

19380 MT. ELLIOTT DETROIT 12, MICH. Twinbrook 1-8374 - - - 1-7561

#### PRECISION FORM GRINDING

Specialists in grinding Circular and Flat FORM-TOOLS, FORM Counterbores, FORM Flat-Drills, and related types of FORM grinding. Also step-grinding of Tungsten and Molybdenum Rods.

Send Prints for Quotation and Delivery

3. & S. TOOL CO., 477 Mein St., E. Orunge 5, N. J.
(Makers of J. & S. Radii and Angle Dressing Tools)

Manufacturers' agents, located in Milwaukee, desire line of Electrical or Mechanical products for Wisconsin, upper peninsula of Michigan and northern Illinois. Have electrical and mechanical knowledge sufficient to sell, install and service these types of products. Our contacts cover all principal manufacturing plants located in the above area. Write Box No. 96, Modern Machine Shop, 431 Main Street, Cincinnati 2, Ohio.

#### TOOL DESIGNERS

Should have experience designing Jigs, Fixtures, Stamping Dies, Plastic Molds, Gages, Cutting Tools, etc., on small precision parts. Must be experienced in one or more of the above classifications. Large, well established N. E. Ohio manufacturer now fully engaged in vital war work. Excellent post-war opportunities. Living conditions good in small town or nearby medium sized city. W.M.C. Rules and Regulations apply. If qualified, address replies to Box No. 93, care of Modern Machine Shop, 431 Main St., Cincinnati 2, Ohio.

#### **POSTWAR WORK**

Are you a small machine shop looking ahead for postwar work?

We are now planning our postwar production. We will require quantity production of small parts and small assemblies.

If you are interested we will welcome your inquiries.

We are located in the Philadelphia vicinity.

Address Box No. 92, Modern Machine Shop, 431 Main St., Cincinnati 2, Ohio.



### WHERE TO GET IT

F

G G

Ğ

GGGGGGGG

Abrasive Cloth, Paper, Disc, Belts, Stones, Etc., 207, 157, 108, 35, 63, 28 Adapters, 331

Air-Operated Equipment (Look for specific item) Alloys, 214, 215, 250, 317, 333, 278 Angles, 231, 33, 421

Arbors, 277

Backstands, 303 Balancing Machines, 7 Balancing Ways, 405, 394 Barrels, 235 Bearings, Oilless, 321, 384 Bearings, Roller, 227, 301, 1

Bearings, Special, 327, 1 Bearings, Thrust, 332 Belt Fasteners, 324 Benches, Work, 408 Bench Legs, 368 Bench Tops, 368 Bending Machines, 390

Bending Rolls, 45 Blades, Cutting-Off, 300, 122, 56

Blowers, 211 Boring Bars, 226, 313, 55 Boring, Drilling and Milling Machines, Horizontal, 42, 43

Boring, Drilling and Tapping Machines, Multiple, 220

pie, 220 Boring Heads, 323, 154, 158, 373, 388 Boring Machines, 255 Boring Mills, Horizontal, 42, 43 Boring Mills, Universal, 4 Boxes, Shop, 235, 368

Brakes, Press and Bending, 137, 48 Broaches, 249, 255, 270, 290 Broaching Machines, 249, 133

Broach Sharpening Machines, 255

Bronze Bars, 203, 301 Buffers, Portable Electric, 183, 224, 436

Buffers, Portable Pneumatic, 224 Buffling Machines, 183, 339

Burring Machines, 381 Burs, 241, 264, 413 Bushings, 301, 344

Bushings, Drill Jig. 255, 276, 3°2, 464, 379 Bushings, Drill and Pilot, 246

Carbides, 188, 395, 414

Centering Machines, Automatic, 16

Centers, Bench, 401 Centers, Lathe, Planer, Miller, Etc., 319, 73, 82, 56, 348, 387, 405, 431, 375

Chairs, 235 Chasers, 380 Chilling Equipment, Industrial, 93

Chippers, Portable Pneumatic, 211, 224 Chisels, 412

Chisels, 412
Chucking and Indexing Fixtures, 402
Chucking Machines, Automatic, 171
Chucks, Collet, 226, 338, 67
Chucks, Drill, 178, 78, 355, 372
Chucks, Lathe, 325, 118, 342, 409
Chucks, Magnetic, 267, 155, 161, 86, 370, 165
Chucks, Tap, 78
Chucks, Wire, 370
Clamps, 59, 38, 412, 380, 390

Clamps, 259, 38, 412, 380, 390

Clamps, Air, 170 Cleaners, File, 412 Cleaners, Vacuum, 243, 202

Cleaning Equipment, 295 Clinching Machines, 212 Clutches, 248, 166, 366 Comparators, 16

Compressors, Air and Gas, 211, 224, 233 Controlling Devices, 212, 233, 378

Counterbores, 189, 236, 156, 279, 380 Countersinks, 241, 383, 413

Couplings, Flexible, 206 Cranes, 239 Cross Slides, 277

Cut-Off Machines, 416 Cut-Off Wheels, 163, 80, 81 Cutters, Bar, Rod, Etc., Hand, 359

Cutters, Flue Sheet, 380 Cutter Sharpening Machines, 152, 52

Cutters, Milling, 189, 212, 226, 236, 200, 252, 331, 376 Cutters, Washer, 412 Cutting Oil Germic'des, 340

Cylinders, Hydraulic and Pneumatic, 212, 233. Second Cover, 418

Demagnet zers, 372, 405 Diamonds and Diamond Tools, 281, 284, 318, 46,

18, 19, 2387, 393, 21 Diamond Wheels, 46, 368, 21

Die Feeds, 337

Die Heads, Threading, 2, 171, 271, 60, 323, 16, 380 Diemakers' Suppl.es, 326

Die Making Mach nes, 90 Dies, 188, 189, 195, 229, 315, 324, 61, 365, 24, 25, 27, 397, 403, 378 Dies, Acorn, 61 Die Sets, 338

Disintegrators, Metal, 251 Dividing Heads, 309, 277 Dogs, Lathe, Grinder and Miller, 38, 348

Drafting Materials, 353 Dressing Fixtures, Grinding Wheel, 309, 357, 363, 18, 19, 382, 466, 411 Dressing Tools, 281, 284, 108, 357, 363, 405, 382, 411 Drill Heads, 162, 322, 334, 64, 417

Drilling Attachments, 394
Drilling Machines, Bench, 343, 345
Drilling Machines, Multiple Spindle, 275, 261, 95. 343. 22

Drilling Machines, Radial, 135, 149, 285, 371, 14.

22, 416 Drilling Machines, Vertical, 225, 261, 135, 416 Drilling, Milling, Tapping and Screw-Inserting

Machines, Automatic, 95 Drills, Center, Core, Twist, Square, Etc., 189, 262, 270, 279, 334, 76, 26, 419, 427, 376, 380 Drills, Portable Electric, 181, 224, 261, 271, 97, 12°.

Drills, Portable Pneumatic, 211, 224 Drives, Motor, 269, 410 Duplicating Machines, 41, 48

Dust Control Equipment, 267, 325, 155, 301, 3 5, 101, 52, 436

Electroplating Equipment, 54 Engines, Oil and Gas, 211 Engraving Machines, 270 Etchers, 330, 41, 372, 465 Facing Heads, 210, 154 Feed Units, 205, 337

Files, 143, 283, 332, 65, 383, 413, 420 Files, Band, 267, 175, 101, 381

Files, Oilstone, 207

Files, Rotary, 159, 283, 15, 413 Filing Machines, 267, 155 Finishing Machines, 3 Flexible Shaft Equipment, 261, 265, 117, 51, 15, 416 Forgings, 39 Forming Machines, 361 Furnaces, Heat-Treating, 257, 311, 164, 361 Gage Blocks, 209, 267, 155, 101, 59 Gage Handles, 320 Gages, 217, 236, 234, 256, 309, 329, 176, 273, 299, 302, 113, 70, 76, 49, 52, 357, 373, 391, 399, 377, 378, 388, 392 Gear Burring Machines, 107 Gear Chamfering Machines, 107 Gear Cutting Machines, 223, 249, 5, 11 Gear Finishing Machines, 5 Gear Measuring Instruments and Machines, 182 Gear Rolling Fixtures, 309 Gears and Gear Units, 168, 300, 380, 381, 382 Generators, 233 Grinders, Abrasive Band and Disc, 183, 318 Grinders, Abrasive Belt, 258, 92 Grinders, Air, 211, 221, 260, 81, 47, 351 Grinders, Bench, 339, 356 Grinders, Carbide Tool, 183, 185, 32, 374 Grinders, Centerless, 8, 9 Grinders, Chip Breaker, 185 Grinders, Contour, 169 Grinders, Cutter and Tool, 183, 185, 90, 41, 44 Grinders, Cylindrical, 12, 13 Grinders, Die, 200
Grinders, Die, 200
Grinders, Disc, 416
Grinders, Drill, 232, 339, 115, 87, 90, 52
Grinders, External, 292
Grinders, Face Mill, 90, 17
Grinders, Coop, 200 Grinders, Gear, 309 Grinders, Internal, 119, 3, 12, 13 Grinders, Jig, 173 Grinders, Pedestal, 183, 269, 307, 99, 350, 32 Grinders, Portable and Tool Post, 339 Grinders, Portable Electric, 224, 208, 331, 97, 47, 436 Grinders, Profile, 222 Grinders, Snagging, 339 Grinders, Surface, 267, 169, 155, 307, 101, 350, 356, 3, 6, 398 Grinders, Tap, 87, 52 Grinders, Tap, 87, 52 Grinders, Threau, 2, 255, 225, 16 Grinders, Tool B.t, 255, 90 Grinders, Universal, 119, 75, 53, 12, 13 Grinding Fixtures and Attachments, 99, 421 Grinding Heads, 152 Grinding Wheels, 218, 219, 186, 187, 197, 224, 163, 147, 157, 307, 99, 108, 80, 81 Grinding, Segments, 218, 219, 186, 187, 163 Guards, Gear, 330 Guns, Air, 233 Hammers, 328 Hammers, Plastic, 238 Hammers, Portable Pneumatic, 211, 224 Hand Tools, Power (Look for specific item) Hardness Testing Devices, Front Cover Heaters, 388 Hinges, 290, 376 Hobbing Machines, 246 Hobs, 189 Hoisting and Conveying Machinery, 239 Holders, Die, 178, 247 Holders, End Mill, 331, 277 Holders, Knurl, 373
Holders, Tap, 178
Holders, Tool, 300, 122, 78, 38, 52, 56, 377
Holders, Type, 174, 324, 27
Hole Checking Machines, 299
Hole Cutters, 389 Hole Cutters, 369 Hole Lecators, 266 Hones, Diamond, 163 Honing Machines, 293, 347 Hopper Units, Motorized, 386 Hydraulic Equipment (Look for specific item) Pumps, Hydraulic, 213, 233, 351

Indicators, 217, 256, 113, 49 Induction Heating Equipment, 167 Inspection Devices, Front Cover, 302, 113, 49, 59, 391, 378 Jig Borers, 14, 17 Jigs and Fixtures, 253, 259, 277, 58, 346, 404 Joints, Universal, 110, 310 Keyway Cutting Machines, 229, 210, 282, 386 Knives, 100 Lapping Machines, 225, 255, 293, 8, 9 Lathes, Automatic, Third Cover, 169, §3, 40, 7, 16 Lathes, Bench, 258, 153, 57 Latties, Benefit, 208, 108, 91 Latties, Engine and Toolroom, 177, 198, Third Cover, 149, 153, 282, 284, 169, 116, 83, 94, 40, 57, 53, 367, 23, 345, 432 Latties, Polishing, 307, 416 Lathes, Speed, 183, 98, 336 Lathes, Turret, 226, 153, 282, 284, 109, 116, 7, 16, 23 Layout Materials, 268, 379, 382, 374 Levels, 363, 386 Lighting Equipment, 368, 396 Light Wave Measur.ng Equipment, 59 Lubricants, 382 Lubricators, 246 Magnifiers, 174 Mallets, Rawhide, 328 Mandrels, Expanding, 260, 316, 72, 432 Marking Machines, 315, 306, 102, 322 Metallizing Equipment, 201 Micrometers, 273, 49, 373, 377 Milling Fixtures, 277 Milling Machine Attachments, 17, 394 Milling Machines, Automatic, 289 Milling Machines, Hand, 192, 10, 29 Milling Machines, Horizontal, 10 Milling Machines, Rotary Head, 17 Milling Machines, Universal, 287, 289, 41, 50, 16. 345 Milling Machines, Vertical, 41 Mills, End, 236, 252, 279, 334, 429 Mills, Hollow, 156, 369 Molds, 378 Motors, 233, 269, 410, 416 Mounted Points and Wheels, 186, 187, 163, 80, 81 Nibblers, 359, 367, 381 Numbering Machines, 396 Oilers, 246, 366 Oils, Cutting, 139, 267 Oils, Grinding, 114 Oil Stones, File, 207 Pans, Tote, 270 Parallels, 273 Pins, 255 Planer-Millers, 4 Planers, 88 Plates, Angle, 231, 33, 404 Plates, Bench, 359 Plates, Index, 309 Plates, Lapping, 280 Plates, Screw, 229 Plates, Surface, 280 Pliers, 320 Polishing Machines, 183, 339 Polishing Wheels, 63 Power Units, Hydraulic, 255, 309 Presses, Air, Second Cover Presses, Arbor, 91, 397 Presses, Foot, 298 Presses, Hydraulic, 165, 91, 388 Presses, Power, 165 Presses, Punch, 104, 397, 388 Protectors, Dust, 390 Pulleys, 267 Pumps, Centrifugal, 211 Pumps, Coolant and Lubricant, 335, Second Cover, 275, 295, 77 Pumps, Fuel Oil, 255

Pumps, Liquid Transfer, 295, 77 Pumps, Vacuum, 224 Punches, 200, 272, 412 Punch Press Feeds, 337 Racks, Storage Bin, 296 Reamers, 189, 226, 236, 252, 279, 377, 384 Resurfacing Materials, Floor, 365 Retaining Rings, 89 Riveting Machines, 212, 298 Rust Removers, 85 Safety Equipment, Press, 402 Sanders, Portable Electric, 224 Sanders, Portable Pneumatic, 224, 233 Sanding Drums, 210 Sanding Machines, 210 Saw Blades, Band, 267, 263, 155, 101, 66 Saw Blades, Circular, 385 Saw Blades, Hack, 193, 161, 263, 20, 415, 400 Saw Frames, Hack, 49 Sawing Machines, Band, 245, 267, 261, 155, 101, 106, 112, 49, 20, 389, 416, 381 Sawing Machines, Circular, 261, 375 Sawing Machines, Hack, 213, 288, 20, 374 Saw Sharpening Machines, 408 Scalers, Portable Electric, 224 Scalers, Portable Penumatic, 224 Scrapers, Hand and Power, 326 Screw Drivers, Hand, 230 Screw Machines, Hand, 277, 53, 375 Screws, Cap, Set, Socket and Machine, 191, 254, Fourth Cover, 78, 62 Screws, Transfer, 242, 386 Screws, Transfer, 242, 369 Services; Milling, Grinding, Lapping, Rebuild-ing, Repairing, Business, Etc., 103, 422, 423, 58, 366, 364, 379, 381 Shaper-Planers, 88 Shapers, 137, 106, 88, 94, 345 Sharpening Fixtures, 152 Shearing Machines, 272, 137, 150, 100, 48, 359 Sine Bars, 309 Sleeves, 384 Slotting Machines, 88, 371, 375 Sockets, 286, 291, 38 Solenoids, 237, 171 Spacing Collars, Arbor, 316, 362 Special Machinery, 7 Speed Reducers, 377

Spline and Index Fixtures, 309 Spot Facers, 279, 380 Spray Equipment, 233 Stamps, 195, 314, 324, 396 Steel, General Purpose, 199 Steel, Sheet, 199 Steel Stock, Ground Flat, 199, 49 Stools, 235 Straightening Machines, 179, 111 Stud Setters, 78 Surfacing Machines, Abrasive, 278, 92, 416 Tables, Rotary and Index, 314, 375 Tap Extractors, 251 Tapping Attachments, 64, 15
Tapping Machines, 184, 323, 271, 467
Tapping Units, 64, 372, 407 Tap Reconditioning Machines, 386 Taps, 2, 195, 229, 99, 68, 61, 358, 365, 189, 377 Taps, Collapsible, 323, 271 Threading Machines, 2, 271, 287, 292, 71, 323 Tool Attachments, Angle, 34 Tool Bits, 247, 333, 122, 334, 69, 387, 395 Tool Blanks, 200, 333, 387, 395 Tool Cribs, 304 Tools, Bending, 154
Tools, Boring, 289, 387
Tools, Carbide Tipped, 297, 96, 414
Tools, Cutting Off, 145 Tools, Deburring, 264
Tools, Facing, 247, 154, 156, 387
Tools, Form, 334 Tools, Grooving, 387 Tools, Knurling, 349 Tools, Shearing, 387 Tools, Special Cutting, 236, 247, 255, 331, 154, 279. 316, 70, 96, 385 Tools, Threading, 287 Turrets, Lathe, 226, 277, 79, 36, 37 Valves, 233, 237, 335, Second Cover, 175, 312 Vises, Bench and Machine, 231, 244, 309, 172, 277. 294, 308, 118, 312, 373, 375, 400 Wear Parts, 188 Welding Equipment and Supplies, 204, 264, 151. 352, 360, 30, 31, 406



Max-el Machinery Steels. A 12-page booklet containing handy data and stock information on Max-el 1-B, 2-B, 3, 3½, and 4 Machinery Steels has been prepared by the Crucible Steel Company of America, 405 Lexington Ave., New York, N. Y. Copy free upon request.

Wire Stripping Machines, 398 Wrenches, 339, 286, 291, 320, 74, 78, 38, 341

Timken Hardenability Calculator. A circular slide rule for use in computing the approximate hardenability of steel from its chemical composition and grain size in accordance with standard formulae has been designed by the metallurgical engineers of the Steel and Tube Division, The Timken Roller Bearing Co., Canton 6, Ohio. A copy of the calculator may be obtained by addressing a request on a company letterhead.

# Immediate Delivery

No. 1 to 60

New High Speed

Long Length

## DRILLS

No. by Gage	Longth	Our Price Not Each
1 to 10	61/4	\$ .75
11 to 20	53/4	.75
21 to 30	53/8	.75
31 to 40	51/4	.75
41 to 50	41/2	.75
51 to 60	41/4	.75

If you buy 60 drills or more — 20% discount.

## VICTOR MACHINERY EXCHANGE, INC.

251 CENTER STREET Phone: CAnal 6-5575 NEW YORK, N. Y.



"I'm Getting Married on My Lunch Hour"

"Tools for Milling Machines" is the title of a catalog now being issued by the Kearney & Trecker Products Corp., Milwaukee 14, Wisc. The catalog contains complete technical data on arbors, cutters, vises, and other accessories and equipment.

Designated as the No. C10, this 50-page catalog is spiral bound so that pages lie flat and smooth for quick, easy reading. Copy free to executives addressing requests on their company letterheads.

Safety Marking Tools. A four-page bulletin covering the line of safety marking tools manufactured by the M. E. Cunningham Co., 158 E. Carson St., Philadelphia 19, Pa., has been issued by this firm. Included are details on letter, figure, and symbol type, as well as holders for the same. Also provided is a page on the wide variety of safety, date and inspection symbols available in Cunningham stamps. Copy of bulletin free upon request.

#### Preferred .. FROM MACHINE TO FRONT OFFICE



### FACTS PROVE TO ME THAT PUTNAM END MILLS ARE

THE Best"

"Actual production figures show that the performance and durability of Putnam End Mills make them by far the most economical tools of this type that we have

used. The Purchasing Department states that we always get immediate delivery on all orders placed with Putnam. That adds up to complete satisfaction in every department."

That's why Putnam End Mills rate "front office preference" just as they do among production and purchasing men.

The largest and most complete line of end mills in the country. Supplied Immediately from distributor and factory stocks.



2981 Charlevoix Ave.

SPUTNAM TOOL COMPANY

· Detroit 7. Michigan

#### Over the Editor's Desk

#### A Battle Star for the Tool Engineer

HE war is ended-won by American soldiers and sailors and airmen who met the enemy and whipped him on the seas, in the air and on the land. To these boys America owes a debt that can never be paid.

America pays tribute to its fighters, but at the same time derives a certain amount of satisfaction from the fact that it gave its fighters the best in fighting equipment and in quantities sufficent to overwhelm

the enemy.

This war has been a war of production -a war the outcome of which depended upon the ability of one nation to overcome the other by the power and quantity of its arms. The nation that could not meet the production challenge faced defeat. And America won-won because it had behind its production front a corps of highly-trained specialists who are unequalled in their skills in any country in the world. These are the Tool Engineers. American Tool Engineers won the Battle of Production, without which all of the other battles would have been lost.

The best of factories can be built: the best of equipment can be installed: the best in materials can be procured—but the successful coordination of these factors for the maximum possible production depends, in the last analysis, upon the peculiar abilities of the Tool Engineer -abilities in which the imagination of the inventor is combined with the techniques of the skilled artisan and the training of the mechanical engineer.

It is the Tool Engineer who decides upon the manufacturing process that will produce a completed piece in the shortest possible time; it is the Tool Engineer who decides upon the type of machine that will make it possible to achieve this objective; it is the Tool Engineer who plans the tools that are to be used on the machine in which the piece is to be

machined; it is the Tool Engineer who plans the means by which the parts in process will be moved from one operation to another so that a minimum of time will be lost between production operations. During the past four years the Tool Engineer's burden has been heavy indeed, but he has carried it creditably.

The science of "tool engineering" is largely a development of the American automobile industry. It is true that some fine tooling had been done in the manufacture of telephones at the Western Electric Plant in Chicago, and in some of the sewing machine factories, but the unparalleled development of the automobile industry offered a new and great opportunity for the ingenuity and inventiveness which have been peculiarly characteristic of the American people.

From the designing of the simple jigs and fixtures with which the automobile industry started out, tool designing gradually developed into a highly specialized branch of engineering in which the traditional ideas of tool cost limitations and manufacturing methods were scrapped to meet the ever-increasing demand for higher production and lower unit costs.

As pressure for production increased, the demands upon the Tool Engineer increased and his abilities were necessarily widened to include a knowledge of machine design, toolmaking, heat treating, materials, and cost accounting, and through these abilities he became the originator of machines and tools that are the marvel of the manufacturing world.

Today all of America's greatest indus. tries have their Tool Engineers, upon whom they depend for maximum production and minimum costs. In the recent conflict American Tool Engineers won the Battle of Production, and we here and now nominate them for a Battle Star or its equivalent.

Howard Campbee

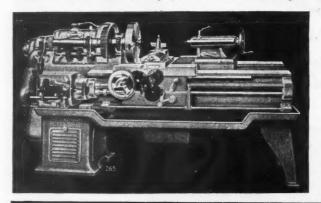


### CINCINNATI

QUICK-CHANGE GEARED-HEAD MOTOR-DRIVEN

### LATHES

#### Supplied with whatever equipment is needed for your specific requirements



Latest catalog contains detailed specifications on 14", 16", 18", 20". 22", 24", 27" and 30" sizes. With them cre obtainable 32 to 96 changes of thread and feed; 12 to 24 spindle speeds by simply shifting the lever to cover every shop require-ment. Whether in tool room or manufacturing plants, CINCINNATI LATHES give most remarkable performance.

Designed and produced by specialists since 1906.

THE CINCINNATI LATHE & TOOL CO. MARBURG AVENUE, OAKLEY, CINCINNATI, OHIO

## NICHOLSON Expanding MANDRELS



#### TYPE B-STRAIGHT JAW DESIGN

Adapted for work with both short and long bores.

Size No.	Range of Bores Taken	Length
IX 2X	1/2" to 18" 18" to 21/32"	5"
3X	21/32" to ¾"	6″
00	%" to %" %" to 1"	81/4"
1 2	1" to 1"4" 1"4" to 1 #	9″ 11¾″
3	1 % " to 2"	13%"

For all bores from  $\frac{1}{2}$ " to 7". Hardened tool steel, accurately ground. Sold singly or in sets. Prompt delivery. Bulletin 1043.

H. NICHOLSON & CO. 136 OREGON ST., WILKES-BARRE, PA.

### **CUT COSTS** ←

#### and Promote Precision

Depend on them to save machine and man hours, time and money.



#### TYPE A-STEP JAW DESIGN

Adapted for holding work with short bores while being machined between centers on lathes, grinders, millers, shapers, etc.

Size No.	Range of Bores Taken	Length Overall
1A	1/2" to 1"	9"
2A	1" to 11/2"	11"
3A	11/2" to 2"	121/4"
4A	2" to 3"	201/2"
5A	3" to 4"	21"

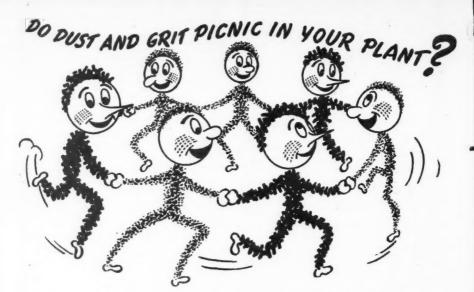


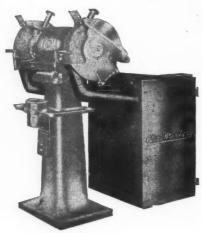
Abart Gear & Machine Co377	Builders' Ir
Abrasive Co	Bullard Co.
Abrasive Machine Tool Co	Bunting Br
Abrasive Products, Inc	Burke Mach
Accurate Bushing Co404	Capewell M
Acme Industrial Co	Carboloy Co
Acme Tool Co	Carborundu
Acme Wire & Iron Works304	Carlton Mac
Aeromark Co	Carroll-Jam
Adroit Manufacturing Co302	Carson-New
Advance Machine Works	Center Tool
Aget-Detroit Manufacturing Co305	Central Scre
Air Reduction Sales Co	Cerro de Pa
Albertson & Co., Inc	Chambers C
Alco Tool Co 178	Challenge M
Allen Tool & Mfg. Co247	Chandler Pr
Allied Products Corp39	Chandler To
Allen Tool & Mfg. Co.       247         Allied Products Corp.       39         Almond Manufacturing Co., T. R.       372	Chandler Pr Chandler To Chicago Pne Chicago Ray
Alvord-Polk Tool Co	Chicago Ray
Alvord-Polk Tool Co	Chicago Too
American Cutter & Eng Corp 96	Chicago Too Chicago Wh
American Cutter & Eng. Corp	Chrysler Co
American Course Co. 999	Cincinnati H
American Gauge Co	Cincinnati E
American Pipe Bending Machine Co., Inc390	Cincinnati (
American Pipe Bending Machine Co., Inc	Cincinnati C
American Screw Co	
	Cincinnati I Cincinnati M
American Tool Works Co143	
Ames Co., B. C206	Cincinnati F
Anderson Bros. Mfg. Co394	Cincinnati 8
Anker-Holth Mfg. Co418	Cincinnati '
Apex Machine & Tool Co	Circular Too
Arguto Oilless Bearing Co384	Cities Service
Armstrong-Blum Mfg. Co20	Clark Jr. E
American Tool Works Co.       143         Ames Co.       256         Anderson Bros. Mfg. Co.       394         Anker-Holth Mfg. Co.       418         Apex Machine & Tool Co.       78         Arguto Oilless Bearing Co.       384         Armstrong-Blum Mfg. Co.       20         Armstrong-Bray & Co.       324         Arthing & Co.       122         Atking & Co.       20         Atking & Co.       20	Clark Compa
Armstrong Bros. Tool Co122	Cleveland Pr
Atkins & Co., E. C.       263         Atlantic Gear Works       168         Atlantic Saw Mfg. Co.       66	Cleveland W
Atlantic Gear Works168	Clinton Mac
Atlantic Saw Mfg. Co66	Colborne Mi
Atlantic Screw Works	Colonial Bus
Atlas Press Co345	Commercial
Auto Engraver Co 970	Conant Tool
Automatic Machine & Tool Co	Consolidated
Automatic Machine & Tool Co.         206           Auto Moulding & Mfg. Co.         376           Avey Drilling Machine Co.         22	Continental
Avey Drilling Machine Co. 99	Continental
Bartelt Engineering Co373	Div. of I
Rath & Co Inc John 68	Cooley Elect
Bath & Co., Inc., John	Coulter Mac
Pay State Abrasiva Products Co. 169	Covel-Hanch
Day State Abrasive Products Co	
Behr-Manning Corp	Covel Manus Criterion Ma
Bellows Company         205           Besly & Co., Charles H.         99	
District Co., Charles H	Cross Compa
Bicknell-Thomas Company	Cullen-Friest
Billings & Spencer Co., The	Curtis Unive
Black Diamond Saw & Machine Works, Inc., 232	Dalzen Tool Danly Mach Davis Keyse
Blake Company, Edward52	Danly Mach
Bodine Corporation95	Davis Keyse
Boggis & Co., H. P	Dayton Roge
Boice-Crane Co343	Dearborn, J. Dearborn Ga
Bokum Tool Company414	Dearborn Ga
Bone Tool & Gauge Co378	Denison Eng
Black Diamond Saw & Machine Works, Inc., 232         Blake Company, Edward       52         Bodine Corporation       .95         Boggis & Co., H. P.       .152         Boice-Crane Co.       .343         Bokum Tool Company       .414         Bone Tool & Gauge Co.       .378         Boyar-Schultz Corp.       .349         Boye & Emmes Machine Tool Co.       .367         Bredford Machine Tool Co.       .974	Derbyshire,
Boye & Emmes Machine Tool Co367	Desmond-Ste
Diadroid Machine 1001 Co	Dessau & Co
Brand Tool & Supply Co377	Detroit Beve
Brewster-Squires Co	Detroit Pow
Bridgeport Saftey Emery Wheel Co307	Detroit Stam
Bristol Co	Diamond Too
Brown & Sharpe Mfg. Co	Dickerman M
Bristol Co.         191           Brown & Sharpe Mfg. Co.         77           Brown Engineering Co.         344, 366	DoAll Compa
Bruno Tools	Dolge Compa
Buffalo Forge Co45	Dorman Mac
Dube Machine Meet Co.	Danmler Mes

Builders' Iron Foundry398
Bullard Co
Purks Machine Tool Co. 199
Bullard Co.   220
Carboloy Co., Inc387
Carborundum Co
Carlton Machine Tool Co371
Carlton Machine Tool Co
Carson-Newton Co. 332
Conton Tool 430
Central Screw Co191
Central Screw Co. 191 Cerro de Pasco Copper Corp. 278 Chambers Chaser Co. 380 Challenge Machinery Co. 359
Chambers Chaser Co
Chardler Products Corp. 191
Chandler Products Corp.         191           Chandler Tool Co.         154           Chicago Pneumatic Tool Co.         224
Chicago Pneumatic Tool Co. 294
Chicago Rawhide Mfg. Co.         328           Chicago Tool & Engineering Co.         308           Chicago Wheel & Mfg. Co.         80, 81           Chirysler Corp. Amplex Div.         321
Chicago Tool & Engineering Co308
Chicago Wheel & Mfg. Co80, 81
Chrysler Corp. Amplex Div321
Cincinnati Bickford Tool Co
Cincinnati Electrical Tool Co436
Cincinnati Gear Co380
Cincinnati Grinders Incorporated
Cincinnati Lathe & Tool Co432
Cincinnati Electrical Tool Co.   340    Cincinnati Gear Co.   380    Cincinnati Granders Incorporated   8, 9    Cincinnati Lathe & Tool Co.   432    Cincinnati Milling Machine Co.   8, 9    Cincinnati Planer Co.   4    Cincinnati Shaper Co.   137    Cincinnati Tool Co.   412    Circular Tool Co.   295    Circular Tool Co.   295
Cincinnati Planer Co4
Cincinnati Snaper Co
Circular Tool Co
Cities Service Oil Co
Clark Jr Electric Co Jas 274
Circular Tool Co
Cleveland Pneumatic Tool Co84
Cleveland Wire Spring Co235
Chitton Machine Co
Colborne Mfg. Co336
Colonial Bushings, Inc
Commercial Centerless Grinding Co366
Conant Tool & Engineering Co
Consolidated Machinery & Supply Co., Ltd36
Continental Tool Works
Consolidated Machinery & Supply Co., Ltd., 357 Continental Screw Co
Cooley Electric Mfg Corp 311
Coulter Machine Co., James71
ovel-Hanchett Co.         357           ovel Manufacturing Co.         44           riterion Machine Works         158, 374           ross Company         107
Covel Manufacturing Co44
Criterion Machine Works
Cross Company107
Cullen-Friestedt Co360
Curtis Universal Joint Co110
Dalzen Tool & Mig. Co
Danly Machine Specialties, Inc326
Davis Reyseater Co
Dearhorn T W 409
Dearborn Gage Co 329
Denison Engineering Co
Derbyshire, Inc., F. W
Desmond-Stephan Mfg. Co382
Tross Company
Detroit Bevel Gear Co382
Detroit Power Screwdriver Co386
Detroit Stamping Co
Diamond Tool Co
Do All Company
Diamond Tool Co.       284         Dickerman Mfg. Co. H. E.       337         DoAll Company       .101, 155, 267         Dolge Company, C. B.       .340         Dorman Machine Tool Works       .372
Dorman Machine Tool Works 970
Jourglas Machinery Co. Inc. 75

Doyle Vacuum Cleaner Co.         202           Dreis & Krump Manufacturing Co.         361           Dremel Manufacturing Co.         97           Duro Metal Products Co.         261           Duro Company         262	International Nickel Co., Inc214, 215
Dreis & Krump Manufacturing Co361	International Screw Co191
Dremel Manufacturing Co	
Duro Metal Products Co	J. & S. Tool Company
Dykem Company	Jarvis Company, The Charles L
Eastern Precision Gage Co	Johnson Company W E
Eastern Tool Supply Company	J. & S. Tool Company       388, 406         Jarvis Company, The Charles L       .15         Johnson Bronze Co.       203         Johnson Company, W. E.       390         Johnson Gas Appliance Co.       361         Johnson Manufacturing Co.       106         Johnson Tool Co.       203
East Shore Machine Products Co270	Johnson Wasser Co
Eddy Manufacturing Co	Johnson Manufacturing Co
Electric Sprayit Co233	Johnson Tool Co
Eddy Manufacturing Co. 388 Electric Sprayit Co. 233 Empire Tool Co56	Jones & Lamson Machine Co
Enco Manufacturing Co	Kalamazoo T. & S. Co112
Etteo Tool Co., Inc64	Kar Engineering Co., Inc.         370           Kearney & Trecker Corp.         17           Keller Tool Co.         200
Falcon Tool Co.         236           Famco Machine Co.         150           Farrel-Birmingham Co.         15           Federal Machine & Welder Co.         20	Kearney & Trecker Corp17
Famco Machine Co 150	Keller Tool Co
Farrel-Birmingham Co. Inc. 5	
Federal Machine & Welder Co30, 31	Keo Cutters316
Federal Products Corp 917	Kett Tool Company34
Fell Co., Wm B 363	Knight Machinery Co., W. B
Fell Co., Wm. B.       363         Fellows Gear Shaper Co.       11         Firth-Sterling Steel Co.       24, 25	Keo Cutters         316           Kett Tool Company         34           Knight Machinery Co., W. B.         110           Koebel Diamond Tool Co.         318
Firth-Sterling Steel Co. 24 25	Lamson & Sessions Co191
Flexrock Co	Landia Machine Co
Florian Manufacturing Co. 379 Flynn Manufacturing Co. 388	Landis Tool Company
Flynn Manufacturing Co. 388	Leach Machinery Company, H
Fonda Gage Co	LeBlond Machine Tool Co., R. K Third Cover
Foote-Burt Co. 285	Lee Company, K. O
Foote-Burt Co	Landis Machine Co.  Landis Tool Company 12, 13 Leach Machinery Company, H. 292 LeBlond Machine Tool Co., R.K. Third Cover Lee Company, K. O. 185 Lehmann Machine Company 109 Lehmann Bross Inc. 204
Foredom Electric Co 51	Leiman Bros., Inc
Forthman, Cliff J 326	Lempco Products, Inc. 165
Forthman, Cliff J. 326 Fosdick Machine Tool Co	Leiman Bros., Inc
Fulflo Specialties Co., Inc. 335	Lepel High Frequency Lab., inc
Fulmer Co., C. Allen	Lewthwaite Machine Co., T. H200
Gallmeyer & Livingston Co	Lima Electric Motor Company
Gallmeyer & Livingston Co	Lincoln Park Industries, Inc76
Geier & Bluhm Inc.	Linderme Machine & Tool Co
Geier & Bluhm, Inc.         386           General Aircraft Equipment Co.         69           General Die & Stamping Co.         67	Line-Rollway Corporation83
General Die & Stamping Co 67	Littleford Bres., Inc330
	Lottleford Bros., Inc
General Manufacturing Co 179	Logansport Machine, Incorporated Second Cover
General Screw Mfg. Co. 191	Lombard Machine Co291
General Manufacturing Co. 179 General Screw Mfg. Co. 191 Genesee Manufacturing Co., Inc. 156	Lucas & Son Inc. J. L. 50 270
Geometric Tool Co	Luers, J. Milton         .300           Luma Electric Equipment Co.         .372           Lynn Manufacturing Co.         .79
Geroter May Corp., Baltimore Div351	Luma Electric Equipment Co372
Giddings & Lewis Machine Tool Co42 43	Lynn Manufacturing Co79
Glern & Anholtt Tool Co	McCrosky Tool Corp.         226           Madison-Kipp Corp.         354           Mall Tool Co.         181
Gilmore & Co., F. F	Madison-Kipp Corp354
Gisholt Machine Company7	Mall Tool Co181
Gits Brothers Mfg. Co	Manufacturers Screw Products
Globe Products Mfg. Co277	Marquette Manufacturing Co.         352           Martin Machine Works, J. E.         172           Marvel Tool & Machine Co.         73
Gorton Machine Company, George41	Martin Machine Works, J. E172
Graham & Co., Inc., John H	Marvel Tool & Machine Co73
Graham Mfg. Co373	
Graham & Co., Inc., John H.         415           Graham Mfg. Co.         373           Grant Manufacturing & Machine Co.         298	Mattison Machine Works         .303           Mead Specialties Co.         .170, 381           Meinhardt Diamond Tool Co.         .46
Gray & Prior Machine Co310	Mead Specialties Co170, 381
Gray Machine Co381	Meinhardt Diamond Tool Co46
Gray-Mills Co295	Mercury Metal Die & Letter Co., Inc27
Greaves Machine Tool Co300	Metal Carbides Corp
Greenfield Tap & Die Corp61	Metallizing Company of America204
Grenby Manutacturing Co119	Metallizing Engineering Co., Inc201
Grob Brotners	Metal Carbides Corp. 188 Metal Carbides Corp. 294 Metallizing Company of America. 204 Metallizing Engineering Co., Inc. 201 Metro-Vise Co. 404 Morro-Vise Co. 323
Grenby Manufacturing Co.   119	Meyer Tool & Engineering Co373 Michigan Chrome & Chemical Co379
Hall Manufacturing Co	
Hannifin Manufacturing Co	Michigan Tool Co. 992
Hannin Manufacturing Co	Mid-West Abresive Co. 100
Hardinge Brothers, Inc	Milford Pivet and Machine Co. 191
Harper Co., H. M	Miller-Knuth Manufacturing Co. 374
Haskins Co., R. G	Milne & Company, A
Hoald Machine Co. 2	Minnesota Mining & Mfg Co
Heim Company	Michigan Drill Head Co
Heim Company         327           Heimann Mfg. Co.         242	Moore Special Tool Co173
Hendey Machine Co 91	Morse Twist Drill & Machine Co26
Hendey Machine Co	Motor Products Corporation.
Hevi Duty Electric Co	
Hevi Duty Electric Co	Deeptreeze Division   1975   1976
Hisey-Wolf Machine Co	Mummert-Dixon Co210
Hjorth Lathe & Tool Co258	Murchey Machine & Tool Co271
Hjorth Lathe & Tool Co	Murray Mfg. Co., D. J388
Hunt & Son, C. B	National Acme Co., The
Huron Machine Products320	National Broach & Machine Co249
	National Burr Co241
Independent Specialties378	National Machine Tool Co
Independent Specialties	National Burr Co
Industrial Products Suppliers	National Twist Drill & 1001 Co
Ingersoll Milling Machine Co. 289 Ingersoll-Rand Company 211	Now England Screw Co. 191
Institute of Product Research	Nebel Machine Tool Co.         198           New England Screw Co.         191           New Method Steel Stamps, Inc.         324
Institute of Floract Research	Hew method breef bramps, inch

New Plastic Corporation       238         Niagara Machine & Tool Works       100         Nichols & Sons, W. H.       29         Nicholson & Co., W. H.       432         Nicholson File Company       143, 283	Sossner Tap & Tool Corp.         .195           South Bend Lathe Works.         .153           Southington Hardware Mfg. Co.         .191
Niagara Machine & Tool Works100	South Bend Lathe Works
Nichols & Sons, W. H29	Southington Hardware Mfg. Co191
Nicholson & Co., W. H432	Spartan Saw Works, Inc
Nicholson File Company	Springfield Machine Tool Co116
Norman Company Inc. C. A. 919	Strathin Composition
Nicholson Frie Company.   135, 285     Nielsen Tool & Die Co.   386     Norgren Company, Inc., C. A.   312     Norma-Hoffman Bearings Corp.   227     North Bros. Mfg. Co.   230     Northern Engineering Works   239     Norton Company   218, 219     Numberall Stamp & Tool Co.   396     Nu-Lite Plastics   384	Springfield Machine Tool Co.         116           Stackbin Corporation         296           Standard Electrical Tool Co.         183           Standard Electrical Tool Co.         183           Standard Gage Company, Inc.         113           Standard Shop Equipment Co.         346           Staples Tool & Engineering Co.         279           Starrett Company, The L. S.         49           Steel Company of Canada, Ltd.         191           Sterling Factory Equipment Co.         388           Stevens, Inc., John B.         375           Stevens Walden, Inc.         286           Strand Manufacturing Co.         402           Strong, Carlisle & Hammond Co.         254
North Bros. Mfg. Co. 230	Standard Gage Company Inc 113
Northern Engineering Works239	Standard Pressed Steel Company62, 408
Norton Company	Standard Shop Equipment Co346
Numberall Stamp & Tool Co	Staples Tool & Engineering Co279
	Starrett Company, The L. S49
Oliver Instrument Co90	Steel Company of Canada, Ltd191
O'Neil-Irwin Manufacturing Co48	Stevens Inc. John P. 275
Parker Company, The Charles400	Stevens Walden Inc. 286
Parker-Kalon Corp. 191 Parkwood Corporation	Strand Manufacturing Co
Parkwood Corporation253	Strong, Carlisle & Hammond Co
Pawtucket Screw Co. 191 Peliow Machine Co. 371	Sturdimatic Tool Co319
Peninsular Chemical Products in 274	Sturtevant Company, P. A341
Pheoll Manufacturing Co	Sunnen Products Co
Phillips Screw Manufacturers	Strand Manufacturing Co.         492           Strong, Carlisle & Hammond Co.         254           Stundimatic Tool Co.         319           Sturtevant Company, P. A.         341           Sunnen Products Co.         347           Sun Oil Company         139           Super Tool Company         297           Syncro Devices, Inc.         193
Pittsburgh Stamp Co., Inc314	Syncro Devices Inc
Plan-O-Mill Corp. 287 Porter-Cable Machine Co. 92 Post Company, Frederick 353	Taft-Peirce Mfg. Co401
Porter-Cable Machine Co92	Temms Silice Corneny 389
Prost Company, Frederick	Tamms Silica Company 382 Tannewitz Works 389
Pratt & Whitney, Division Niles-Bement-Pond Co	Taylor Machine Co 381
Precise Products Co. 20% Precision Paper Tube Co. 396 Procunier Safety Chuck Co. 407	Thermo Electric Mfg. Co. 164 Thompson Grinder Co. 169 Threadwell Tap & Die Co. 229
Precision Paper Tube Co396	Thompson Grinder Co169
Procunier Safety Chuck Co407	Threadwell Tap & Die Co229
Production Machine Co258	Thrittmaster Products Div.
Producto Machine Co	Timken Poller Regging Co
Putnam Tool Company 499	Tomkins-Johnson Company
Quality Tools Die Co. 403	Tool Improvements Co., Inc264
Production Machine Co.         258           Producto Machine Co.         397           Prosser & Son, Thomas.         32           Putnam Tool Company         429           Quality Toolb& Die Co.         403           Quality Tool Works         210           Racine Tool & Machine Co.         213           Reading Machine Co.         386	Torq Electric Mfg. Co410
Racine Tool & Machine Co213	Trico Fuse Manufacturing Co
Reading Machine Co	Trouke Alfred A 314
Ready Tool Co	Tru-Cut Tool Co
Reid Bros. Co., Inc	Threadwell Tap & Die Co.   229
Reiff & Nestor Company358	Udylite Corporation54
Republic Gage Company176	Union Twist Drill Co.,         365           Butterfield Division         365           United States Drill Head Co.         322
Reynolds Machinery Co298	Tinited States Drill Head Co 322
Rivett Lathe & Grinder Inc 53	Utica Drop Forge & Tool Corp320
Robbins Engineering Co	V & O Press Co
Racine Tool & Machine Co.         213           Reading Machine Co.         386           Reading Screw Co.         191           Ready Tool Co.         348           Reid Bros Co, Inc.         350           Reiff & Nestor Company         358           Republic Gage Company         176           Reynolds Machinery Co.         298           Rickert-Shafer Co.         323           Rivett Lathe & Grinder Inc.         53           Robbins Engineering Co.         421           Roberts Rubber Co., Weldon         63           Robertson Machine & Foundry Co.         288           Robertson Manufacturing Co.         186, 187           Rockford Clutch Division,         Borg-Warner Corporation         248	Utica Drop Forge & Tool Corp. 320 V & O Press Co. 338 Vanadium Alloy Steel Co. 317 Van Keuren Co. 59 Vascoloy-Ramet Corporation 333 Victor Machinery Exchange, Inc. 419, 427
Roberts Rubber Co., Weldon63	Van Keuren Co
Pohertson Manufacturing Co., W288	Victor Machinery Exchange, Inc
Rockford Clutch Division.	Vimco Manufacturing Co
Borg-Warner Corporation248	Vincent Steel Process Co411
Rockford Machine Tool Co.	Vinco Corporation309
Roger's Tool Corp., John M	Waldes-Kon-1-Noor, Inc89
Poter Teel Company	Walker-Turner Co. Inc
Royal Products Company 82	Walls Sales Corporation318
Rusnok Tool Works	Waltham Machine Works292
Royal Products Company 82 Rusnok Tool Works 394 Russell Burdsall & Ward Bolt & Nut Co. 191	Vincent Steel Process Co.         411           Vinco Corporation         309           Waldes-Koh-I-Noor, Inc.         89           Walker Co., Inc., O. S         86           Walker-Turner Co., Inc.         416           Walls Sales Corporation         318           Waltham Machine Works         292           Wardwell Mfg. Co.         408           Warren Industries         70
Ruthman Machinery Co.         275           S & S Machine Works         290	Warren Industries
	Watts Bros. Tool Works
Sampson Axcess System, Inc	Watts Bros. Tool Works
Sanford Manufacturing Co	Weldex, Incorporated264, 406
Sampson Axcess System, Inc.       368         Sand-O-Flex Corp.       210         Sanford Manufacturing Co.       356         Savage Company, W. J.       367         Sav-Way Industries       399         Schauer Machine Co.       98         Scherr Co., Inc., George       273         Schmidt, Inc., Geo: T.       192, 396, 322         Scovill Manufacturing Co.       191         Scovill Manufacturing Co.       191	Weldex, Incorporated
Sav-Way Industries399	Wells Manufacturing Corporation245
Schauer Machine Co	Wesson Products Company 231 Westcott Chuck Company 409 Western Tool & Mfg. Co. 260
Schmidt Inc Geo. T 102 306 322	Western Tool & Mfg. Co
Scientific Lubricants Co382	Wetmore Reamer Company313
Scovill Manufacturing Co	Wheelock, Lovejov & Co., Inc
Scientific Lubricants Co	Wetmore Reamer Company   313   Wheelock, Lovejov & Co., Inc.   250   Wheel Trueing Tool Co.   18, 19   White & Bagley Company   114   11
Seneca Falls Machine Co.	Whitney Chain & Manufacturing Co
Services Directory	Whitney Chain & Manufacturing Co
Shakeproof Inc	Wiedemann Machine Co104
Shakeproof Inc. 191 Sheldon Machine Co., Inc	Williams & Co., J. H38
Siewek Tool Division of	Wildemann Machine Co.         104           Williams & Co.         J. H.         .38           Wilson, K. R.         .91           Wilson Mechanical Instrument CoFirst Cover
Simonds Saw & Steel Co	Wolverine Bolt Co 191
Skinner Chuck Company	Wolverine Bolt Co
Smit & Sons, Inc., J. K	Young Arbor Company72
Siewek Tool Division of   Domestic Industries, Inc.   259     Simonds Saw & Steel Co.   193     Skinner Chuck Company   118     Smit & Sons, Inc., J. K.   368     Smith Tool & Engineering Co.   280     Snap-On Tools Corp.   291	Young Arbor Company         72           Zelss, Inc., Carl         174           Ziegler Tool Company, W. M.         377
Snap-On Tools Corp291	Ziegier Tool Company, W. M





It's a daily picnic for dust and grit in your plant if your grinders and buffers are not equipped with AIR-MASTERS. But it's no picnic for your employees or the sensitive parts of fine machinery. The millions of dust and grit particles thrown off by the whirling wheels of buffers and grinders are a real menace. They endanger the health of your employees, as well as the life of fine mechanisms.

Install the AIR-MASTER. It traps dust and grit the moment they fly off the wheels. The AIR-MASTER is fully self-contained—efficient, rugged, dependable. A size for every grinder and buffer. Write today for full details.

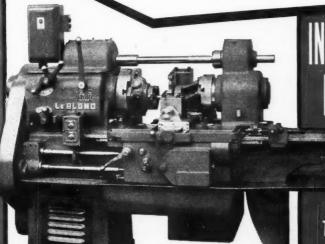
NOW AVAILABLE — Two, Three and Five H.P. grinders and buffers. Write for catalog.

# The Cincinnati

ELECTRIC DRILLS . GRINDERS . BUFFERS . PORTABLE TOOLS

The Cincinnati Electrical Tool Co.

2625-9 MADISON ROAD SMALL CRANKSHAFT
PRODUCTION PROBLEM



NTRODUCING Leblond's

DOUBLE END

DRIVE Crank Pin

TURNING LATHE

flexibleproductive

### LEBLOND No. 1 CRANK PIN LATHE

- 6-Speed Head
- Universal Index Fixture
- Complete Automatic Cycle for Each Pin

Send us your prints and production requirements.







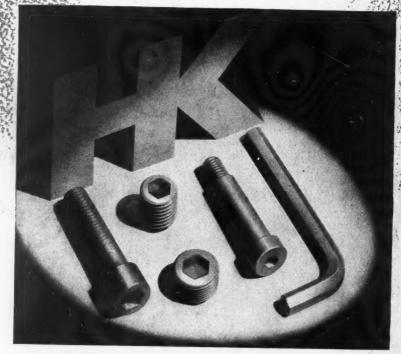
THE R. K

Le BLOND

MACHINE TOOL CO., CINCINNATI 8, OHIO, U. S. A.

NEW YORK 6, Singer Bldg., 149 Broadway, WOrth 2-0722 CMICAGO 6, 20 North Wacker Drive, STA 5561

LARGEST MANUFACTURER OF A COMPLETE LINE OF LATHES



**GUARANTEED BY** 

fibro forged

HOLO-KROME

**SOCKET SCREWS** 

THE HOLO-KROME SCREW CORP. HARTFORD 10, CONN. U.S.A

